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# Contractors *and* Engineers Monthly

Vol. 40, No. 11

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## Highlights Of This Issue

### • Flight-Strip Construction

The construction of the 1,000-foot sand-cement runway extensions for the Flight Strip described in our September issue involved some interesting and unusual problems of methods and equipment. See page 1.

### • Post-War Planning

The final articles in our special series on post-war planning by the construction industry discuss the problems of contractors and their associations, manufacturers and equipment distributors and their present activities in the preparation of plans for post-war business. See page 2.

### • Maintenance by Contract

Two types of highway maintenance done by contract are described in this issue. One deals with concrete patching and resurfacing of concrete roads in Illinois, one of the pioneers in maintenance by contract, and the other describes asphalt and slag resurfacing of state highways in Georgia. See pages 2 and 22.

### • Wartime Bridge Work

Wartime restrictions on construction have radically curtailed bridge construction and considerably affected such bridge work as is permitted. The use of timber construction is exemplified in the 584-foot all-timber Sikanni Chief River Bridge on the Alaska Highway, recently completed to replace the Army's temporary crossing built last year. Another unusual bridge job, on an access road in New Jersey, involved the raising of an old 48-foot span 7 feet 9 inches at one end and 6 feet 6 inches at the other to meet the grade of the new highway. See pages 11 and 32.

### • Care of Equipment

The Ohio Department of Highways has established a thorough and efficient system of motor vehicle inspection and maintenance which has paid dividends in these days of equipment shortages. Also described in this issue are the shops and equipment maintenance program of Tippecanoe County, Ind., which aid in keeping this county's roads in good condition. See pages 13 and 17.

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## Runway Extensions Of Sand-Cement Mix

BRIDGE RAISED IN NEW JERSEY



C. & E. M. Photo  
Black's Creek Bridge near Fort Dix during raising operations, showing one of the mechanical jacks in place under a welded bracket, a hydraulic jack being overhauled, the acetylene welding equipment, and the compressor which furnished the air to drive the pneumatic wrench. See page 32.

Standard 1,000 Foot Areas  
For Emergency Service at  
Ends of New Flight Strip;  
Novel Use of Equipment

(Photos on page 72)

♦ UNUSUAL difficulties with the character of the soil that had to be processed for the soil-cement extensions of a Flight Strip concrete runway in northeastern United States (C. & E. M., September, 1943, pages 32-33) and lack of water and necessary equipment in the local market led the contractor to resort to a novel method of securing the required water, and to produce needed equipment from available sources. The contract called for the processing of a 1,000-foot extension at each end of the 4,000-foot x 150-foot concrete runway.

The soil for the processing was secured from cuts in areas above grade within the right-of-way of the Flight Strip. The cuts were about 30 inches deep. The top 3 inches, consisting of leaves and organic matter, was wasted, the next 27 inches was loam which was used on the loam shoulders of the extensions and the concrete runway, then the sand below this elevation was taken for the soil-cement mix. The sand was placed for the full length and width of the extensions before any work on processing was started.

The plans and specifications called for the production of a soil-cement base 6 inches thick when compacted, requiring  $6\frac{1}{2}$  inches of the sandy soil and 0.55 bag of cement per square yard of completed work 6 inches thick. This figures about 12 per cent of cement. The work was laid out in strips 30 feet wide for 950 feet of the 1,000-foot extensions. The 50 feet next to the concrete was left unprocessed to permit the equipment to turn, and then these two strips were processed transversely at the end of the operations. The outer 30-foot strips, 950 feet long, were processed first to permit the laying of the drainage tile in prepared trenches just outside the strip. Work on the two outer strips at one end was completed, and then operations shifted to the other end of the runway to permit curing of the processed material without disturbance. By the time the equipment returned from the far end, the soil-cement strip adjacent to the work to be done had cured sufficiently to prevent damage to it by manipulation alongside.

The contractor operated from sun-up to dusk and completed a single strip  
(Continued on page 14)



# Post-War Construction

## Contractor Associations, Manufacturers And Distributors Look to the Future

**Contractors' Groups Are Active in Programming Needed Construction; Good "Public Relations" Help**

† IT is generally conceded that in the post-war period there will be a great construction program throughout the world, not only because construction provides jobs to prevent wide-scale unemployment but because the world will need new structures and facilities to replace those worn-out and become obsolete during this period of cessation of construction for civilian needs and to develop fully its productive capacities. New highways, bridges, grade separations, airports, railroads, dams, water works, sewage treatment plants, health centers, and houses, will be needed as soon as possible after the war ends.

The outstanding record of the construction industry in completing the vast war-construction program offers conclusive proof that the industry can and will undertake and complete with speed and efficiency any post-war programs, no matter how vast their scale. Already individual contractors and contractor groups are making plans for the future, and are urging upon both public officials and taxpayers the necessity of immediate preparations of the required plans and blueprints, so that actual work can start at the time it is most needed to aid in stabilizing our national economy.

The United States Chamber of Commerce has set up a Committee on Construction and Civic Development to bring about concerted action among all branches of the construction industry and allied interests in their planning to meet post-war problems and readjustments.

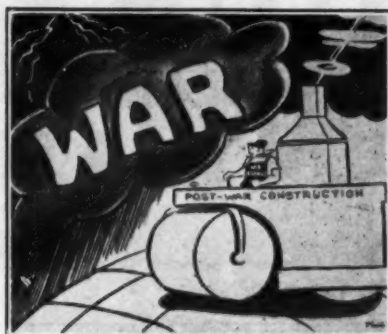
Speaking of this Committee, Eric A. Johnston, President of the Chamber of Commerce, said, "It is hoped that the initiative taken by the construction industry in developing an industry program to supplement and implement the post-war planning of individual companies will be followed by similar forward-looking action by other major business groups."

(Continued on page 20)



C. & E. M. Photo

A typical surface to be replaced in the Illinois 1943 maintenance-by-contract program.



All steamed up and ready to roll when the storm abates?

**Industry Makes Its Plans: Some of Its Problems; How It Can Meet Them and Keep Free-Enterprise System**

† POST-WAR planning for industry involves not only what manufacturers will produce, how much they will produce, and where they will sell it, in the future when peace has been established in the world. Of more immediate concern is the problem of planning for the transition from production for war to peacetime production, with all its uncertainties of sources of material, cancelled government contracts, what to do with greatly expanded personnel, where transition markets may be, and what they will require.

B. W. Clark, Vice President of the Westinghouse Electric & Mfg. Co., speaking on the problems facing industry for war and peace before the Producers'

(Continued on page 24)

**Equipment Distributors Meeting Today's Problems With Eye to Post-War Opportunities**

† POST-WAR planning for the construction-equipment dealer means first of all staying in business during this period when he has practically no equipment to sell. During the intensive war-construction program, the distributor made a great contribution to the war effort, putting at the disposal of contractors and Army and Navy engineers his many years of experience, his knowledge of equipment, his engineering ability in planning job set-ups and in meeting the many unique problems created by the war, and the full facilities of his organization. Now that the peak of war construction has past, and there is little or no equipment to sell, the equipment distributor is still making his contribution on the home front by rental of used equipment, furnishing needed parts, and servicing, repairing, and rebuilding equipment to keep it working on essential construction and maintenance here at home. In spite of many difficulties and handicaps, he is keeping his organization functioning and is looking toward a future when he will once again have equipment to sell and a part to play in peacetime construction.

**The Post-War Situation**

It seems fairly certain that the conversion from war to peace will come gradually in this conflict, rather than all at once. If, as most of the experts

(Continued on page 34)

## Effective Economy In Highway Repairs

**C. H. Apple, District Engineer, Discusses Illinois Methods Of Concrete Patching by Contract**

† GREATER use of the skill and services of contractors in the maintenance of state highways was the subject of our recent interview with C. H. Apple, District Engineer, District 10, Illinois Division of Highways. The installation of this system in Illinois was the idea of Wesley W. Polk, Chief Highway Engineer, and it was used extensively for the first time in 1942, with great success. Many states have been loathe to adopt the contract system for highway maintenance, claiming that specifications could not be written satisfactorily for that type of work, that as the work was not continuous, it was not amenable to contract, and that contractors themselves were not interested.

We have felt that the first two objections have never held water, and now the third is certainly overcome by the lack of construction work for contractors. A contractor can bid on a patching project extending over as much as 75 miles and use a single crew for the work. Contract work also leaves the state forces free for regular maintenance operations such as the care of shoulders, drainage ditches and structures.

The contract system has had particular advantages in speeding repairs in Illinois, where, like many other states, the maintenance program was continuing

at an "as usual" pace, and the roads were deteriorating at an accelerated rate, due to the approach of the end of their service life and to the increase in truck loadings. Overloads due to the war emergency have been particularly destructive on these older pavements when the frost is coming out of the poor subgrade, and the result is much damage to vehicle as well as pavement.

In Illinois, the highways requiring the major attention have been those built during the early '20's, on poor subgrade, 18 feet wide, with 6-foot shoulders, and of a design thickness entirely inadequate to modern speed and loadings. Breaks occurring at 20 to 50-foot intervals are common on all heavy-traffic roads. The

(Continued on page 28)



One of three cinder tipples located at strategic points throughout Franklin County, Ohio, where cinders are stored in the early autumn ready for the first hazards of winter driving.

## Plows and Cinders For County Roads

**Franklin County in Ohio Has Eleven Districts Which Work Independently from Local Headquarters**

† THE maintenance crews in Franklin County, Ohio, operate through eleven patrol districts, each with a reporting headquarters for its winter activities. The all-year crews are the same for each district, with a special guard-rail crew and one for concrete and form work which operate in all districts. Each patrol district covers about 85 miles of county highways. The county owns three storage garages for the district equipment and in the remainder of the districts, barns or garages are rented.

**Snow Plowing**

Each patrol district has a one-way blade plow for mounting on a dump truck and in addition there is a V-plow which is mounted on an FWD truck which is sent into any district where unusual conditions may occur.

The reporting headquarters for each district is responsible, without specific direction from county highway headquarters in Columbus, for the start of snow plowing in its own district. Conditions vary widely between the districts in the northern part of the county and those in the southern, so that it might be necessary for plowing to start and continue for some time in one section of the county, while snow would be so light in another section that no plowing would be necessary. In all cases, plowing starts as soon as there is enough snow on the road to be moved by the one-way blade plows.

**Ice-Control Methods**

Far more important than the snow plowing in Franklin County is the problem of ice control. There are many more days in winter when it is necessary to spread treated cinders on the roads, than there are days when snow requires the calling out of plows.

Both crushed-gravel grits and cinders

(Concluded on page 7)



Spreading finely ground chemically treated cinders to reduce the hazards of ice and snow on a Franklin County, Ohio, road.



# Your post-war road or street program

A series of advertisements pointing out how TEXACO Asphaltic products can fit into your program

#8  
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ASPHALTIC  
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Night shift constructing a TEXACO Asphaltic Concrete runway for a Florida airport. (Inset) This section of three U. S. highways in Lakewood, Ohio, also is paved with TEXACO Asphaltic Concrete.

"Tank tracks," on which new army tanks are put through their paces before shipment, also provide a severe test for pavements. Today, under the grueling traffic of such tracks, Asphaltic Concrete paving again is proving itself the most satisfactory surface for hard wear.

TEXACO Asphaltic Concrete consists of fine graded or coarse graded mineral aggregate, sand, filler and asphalt cement, mixed hot in a plant. Because the aggregate may be either broken stone, crushed gravel or slag, this heavy-duty pavement for streets, highways or airports may be laid almost anywhere in the United States at reasonable cost.

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ability and low upkeep, a pavement of this type is skidproof, easily cleaned and attractive in appearance.

TEXACO Asphaltic Concrete may be laid on any type of flexible or rigid foundation, as well as on existing worn pavements of brick, block, concrete, gravel or macadam. When constructed on an asphaltic concrete foundation, the same equipment is used for mixing and laying both the surface and the base.

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# TEXACO ASPHALT



# Contractors and Engineers Monthly

THE NATIONAL BUSINESS PAPER FOR CIVIL ENGINEERING  
CONTRACTORS AND HIGHWAY ENGINEERS AND COMMISSIONERS  
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## Renegotiation Replaces Construction

With the dollar volume of war construction dropping rapidly, the major topic of conversation among prime contractors and subcontractors who have been doing work for the Army and Navy is renegotiation. On the face of it, there would seem to be great value in the ability of the government to thus recover excessive profits that have been made in construction. But take the case of the contractors for one of the largest cantonments, built under unusual conditions where there was not only a great climatic hazard but also a hazard to workers who had to be protected.

Because of these unusual hazards on this job, the prime contractor and subcontractors set their prices fairly high, and were justified in so doing. These contract prices were accepted as satisfactory by the contract board of the military organization involved, although it might have thrown out all bids as too high and asked for new ones.

When a number of the subcontractors completed their work, they found that their profits had been far greater than they expected, because the weather had been much better than the normal conditions in the location, making construction possible at times when normally it would have been impossible to work the men. More rapid completion of the projects was pleasing to the authorities, who wished to place troops there for training at the earliest possible time.

The subcontractors who had benefited by the more-favorable-than-expected weather conditions voluntarily returned a total volume, up to the time of our latest report, of about \$7,000,000, or nearly 25 per cent of the original contract cost of the project. This was a voluntary return of unexpected profits, a notable expression of appreciation of the fact that the contractors, who had feared bad weather, poor labor conditions, and a possible rapid turnover, were pleased with the benefits which favorable conditions had created. They had had to bid high to protect themselves against the possibility of loss on the contract, as the government makes no provision to protect a contractor, and

he has never asked any, if his bid is low and he loses on the work. On the other hand, he feels that, under conditions of war and the need for the most expeditious use of taxpayers' money, he should return the excess profits beyond those justified and normal in the industry. To those contractors who voluntarily renegotiated their own contracts and sent checks to the contract authority for sums totaling at least \$7,000,000, we take off our hats and salute them!

But—renegotiation still stares them in the face. Some boards appointed for the purpose of preventing undue profits assume that the voluntary return of any profits by a contractor is prima-facie evidence of guilt and proceed to renegotiate the harder in order to squeeze all profits from the organization.

We have been discussing the case of contractors who are working in the field covered by CONTRACTORS AND ENGINEERS MONTHLY and whose operations are outdoors, subject to the vagaries of the weather which no governmental agency, however potent, can control. In the case of the manufacturer whose profits increase by careful management under the best operating conditions and who has benefited by the increased skill and incentive of his employees, there is still little reason to see that renegotiation is necessary or proper. In each case, profits are profits, and are subject to the income-tax laws of the country. Corporation taxes and surtaxes are taking above 90 per cent in most cases, so that renegotiation is scarcely a needed tool or threat against either a civil-engineering contractor or a manufacturer.

According to a recent editorial in that usually well-informed newspaper, the *Cleveland Plain Dealer*, renegotiation has become a kind of star chamber activity in Washington, taking on the character of blackmail or the Inquisition. We quote:

"Renegotiations are conducted in strict secrecy. No stenographic records (Concluded on page 63)

## C.&E.M. Appoints New Field Editor

The publishers of CONTRACTORS AND ENGINEERS MONTHLY take pleasure in announcing the appointment of Frank B. Sarles of San Francisco, Calif., as Field Editor, to cover the western section of the country. Mr. Sarles, who is a registered professional engineer in both Arkansas and California, has had a broad and varied experience in the civil-engineering construction field, having served with the Arkansas State Highway Commission, the California Division of Highways, with several contracting organizations, been a partner in a firm of paving contractors, and more recently was supervisor of construction and coordinator of engineering activities on war-construction projects.

Because of Mr. Sarles' many years of close contact with the field served by CONTRACTORS AND ENGINEERS MONTHLY, the publishers feel that his appointment to the editorial staff will provide better coverage of construction activities in the western section of the country, with continued emphasis on practical articles on job organization, methods and equipment, which has always been the feature of C. & E. M.'s editorial policy.

Mr. Sarles, who will make his headquarters in San Francisco, is an Associate Member of the American Society of Civil Engineers, and a member of the National Society of Professional Engineers and of the Society of American Military Engineers.

## New Roadside Park For Safety's Sake

Driving from Fort Leonard Wood to Jefferson City, Mo., last summer we chose Missouri Highway 28 going north through Dixon. About 6 miles south of Dixon we came to a sign "Portuguese Point". Stopping, we enjoyed a most delightful view north and south along the Gasconade River flowing along the foot of the escarpment 300 feet below.

The Missouri State Highway Department has here an opportunity and a dual responsibility to create a roadside lookout that should attract thousands of visitors as soon as America gets back on rubber. The opportunity is obvious when one glances at the scenery as shown in the illustrations, but the dual responsibility needs some explanation. First, such an obvious scenic location should not be wasted, and second, after one has made the scramble over loose stones down a winding path for about 200 feet, he suddenly comes to the edge of a precipice 300 feet high. Posting the sign is an invitation to the passerby to stop, and therefore protection should be afforded the visitor by at least a pipe rail to check a headlong plunge into the scenery.

We are informed that the Maintenance Department has tried to secure this strip of land but to date has not been able to

Scenes at an attractive roadside spot on Missouri Route 28. Left, the highway sign inviting travelers to stop; middle, a downstream view of the Gasconade River; right, looking upstream.

C. & E. M. Photos



Frank B. Sarles, new Field Editor of CONTRACTORS AND ENGINEERS MONTHLY, who will cover the territory west of the Mississippi.

get a deed. A site of this type provides an excellent opportunity for post-war roadside development.

## More Construction Units Needed for Overseas Use

Increasing overseas military and Lend-Lease needs will require the production of at least 21 per cent more construction equipment in 1943, despite this year's estimated reduction of 43 per cent in home-front construction, according to the Construction Machinery Division of the War Production Board.

The military demand for construction equipment has mounted steadily, with 60 per cent of 1941 production required for this purpose, 75 per cent of the 1942 production, and about 90 per cent of this year's output. The percentage needed to fill military demands in 1944 may be even higher, it is reported.

In modern warfare, construction machinery is right up on the fighting front. Tractors, bulldozers, shovels, dirt-moving scrapers, and similar equipment seen on highway and heavy-construction jobs here at home, are now pulling artillery and supplies, loading ships, clearing roads through forests and jungles, filling bomb-pocked airfield runways, and doing a thousand and one other hauling, dirt-moving, and materials-handling jobs which must be completed in a hurry and under fire.

## Transportation Vital

"Perhaps the greatest lesson of this war which is being taught the average citizen is that the domestic economy of this country depends upon transportation, not only the transportation afforded by railroads, airplanes, buses and trucks, but also the individual transportation which each family has in its automobile," said William M. Jeffers recently in *Public Construction News*.



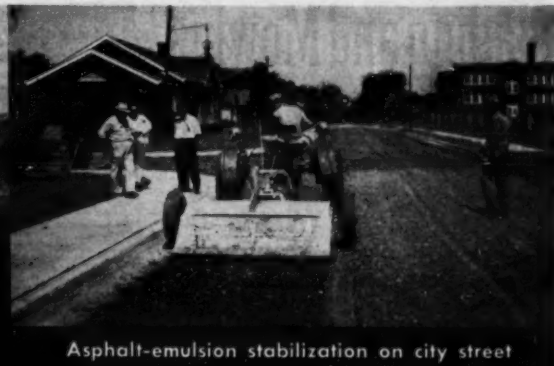




Soil-cement runway. 5 SEAMANS used



Soil-cement airport parking apron



Asphalt-emulsion stabilization on city street



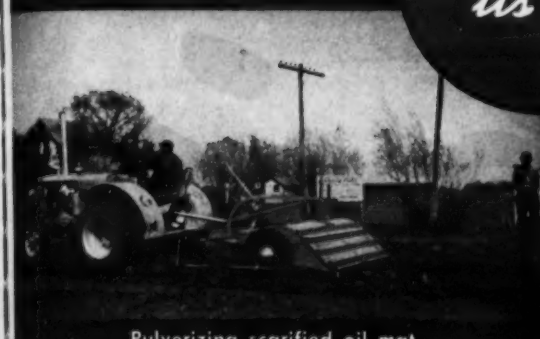
Soil-cement highway

*In the*  
**FINAL SHOW DOWN**  
*it's* **JOB-PERFORMANCE**  
**THAT COUNTS**

*That's Why*  
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Damp-mix processing on soil-cement street



Windrow mixing

Dry-mix in soil-cement stabilization



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## Blading and Mowing Shoulder and Slope

**No High Shoulders Along Indiana Roads Where the Blades Cut True; Mowing is A Serious Problem**

† THE old required 1/2-inch-per-foot slope for shoulders on Federal highways has proved just as out of place in Indiana as elsewhere. It built up rapidly above the pavement, pooling water on the traveled way, which became an ice hazard in winter. Changing the specifications to 1 inch per foot in Indiana has obviated much of the trouble, and now that careful blading is done to keep the turf at that slope, little difficulty is experienced.

### Blading Shoulders

Former practice in Indiana was to drag the shoulder to keep the crushed stone or gravel, which is placed along the shoulder, tight against the pavement. Decreased traffic on certain highways today has permitted weeds to get a hold in the fines in this aggregate, which has saved the need of dragging. One exception to this is on curves, where trucks cut corners and grind out the vegetation, preventing its growth. The same applies to the approaches to RFD mail boxes, where the rural postman swings off the pavement 100 to 150 feet from the box each day, which is just enough to prevent the growth of vegetation.

The blading of shoulders, foreslopes, and ditches by pulled graders is shown in the accompanying illustration. This work was done by a D6 tractor and Galion pulled grader on State Route 37 in the Paoli Sub-District of the Vincennes, Indiana, District. The waste from this blading was either disposed of around culvert headwalls, on low spots along the shoulders, or on the backslopes. Where it had to be moved any distance, it was picked up by one of the Highway Department's Barber-Greene loaders and then hauled by truck to the point of disposition.

### The Mowing Program

On mowing this year the policy has been to keep the roadside mowed from the edge of the pavement to the back of the ditch line. It is hoped that at the end of the season it will be possible to clean up from right-of-way line to right-of-way line to keep the vegetation from getting rank and to prevent snow piling up on the road.

Formerly, the entire space between right-of-way markers was mowed clean before Decoration Day. Now, due to the shortage of help, mowing is not started until just before Decoration Day and continues through the season. State-owned equipment is augmented by mowers hired from farmers in the various sub-districts. The farmers provide the mowers and usually drive them themselves.

Each sub-district in Indiana has from 250 to 325 miles of state highway to maintain, and for this the sub-district has from two to five power mowers.

In the past, the tendency of operators was to mow too close to the ground, resulting in the roots drying up through lack of protection from the hot summer sun. There also was a tendency to mow too rapidly, so that the knives did not operate properly. At present, mowing speeds are restricted to 3 to 5 miles per hour.

The value of weed seeds in reseeding backslopes, particularly where there is a tendency toward erosion, is stressed by the Landscape Supervisor through the Maintenance Division. All cut material is required to be picked up and used as mulch on bare backslopes. If there are no such places for the disposal of the



C. & E. M. Photo  
A well-bladed shoulder and ditch on Indiana Route 37.

cut material, it is burned.

In those areas in Indiana where bluegrass thrives, mowing is usually delayed until the seed has matured, and then the cuttings are left in place as a mulch to encourage reseeding. This is generally

the latter part of June, before other weeds have matured, so that it does no damage. This is the program throughout the entire state.

### Personnel

The maintenance of shoulders through proper blading and mowing in Indiana is under the direction of the State Highway Commission of Indiana, S. C. Hadden, Chairman, and Norman F. Schafer, Superintendent of Maintenance.

### Road-Building Principles Applied to Airport Projects

To meet the demand now and in the post-war "air era" for information on the construction of airport runways, a manual "Principles of Highway Construction as Applied to Airports, Flight Strips and Other Landing Areas for Aircraft" has just been published by the Public Roads Administration. The volume consists of more than 500 pages of text and specifications, illustrated with sixty line drawings and thirty-

three halftones.

Since the construction of runways is largely a matter of highway engineering, the book might well be termed a manual of highway practice, according to the PRA, as it is equally useful for grading and surfacing operations on either airport runways or highways. The manual discusses grading, drainage, and design and construction of all the ordinary types of highway surfaces, and all material is presented ready for practical application by the engineer in the field.

One feature which adds much to the value of the book is the material on soil sampling, testing, identification and classification and on the practical application of such data in fill construction and in the construction of soil bases and surfaces. The design of soil mixtures is illustrated by actual examples.

Copies of this manual are available only by purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. Price: \$1.00.

# TOKIO

**P**USHING highways across the wastes of the Aleutians or other out-of-the-way places puts both tractors and trucks on the spot, and demands tops in lubrication.

To get the kind of lubrication that means high efficiency and long life, contractors more and more are using *Texaco Ursa Oil X\*\**.

*Texaco Ursa Oil X\*\** keeps engines clean, rings free. It holds deposit-forming materials in suspension so that they drain away at oil-change time. It protects alloy bearings, prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmissions and differentials use *Texaco Universal Gear Oil*.

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### THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

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★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.



# TEXACO



## New Versatile Loader For Tractor Mounting

A lifting rack, crane, material or snow bucket, bulldozer and snow plow are among the interchangeable attachments which can be used with the Lull Universal tractor-mounted loader, made by the Lull Mfg. Co., 3612 E. 44th St., Minneapolis, Minn. Designed for use with 25 to 50-hp wheel-type tractors, the Lull loader has a welded steel channel frame heavily reinforced and braced, and is fastened to the tractor frame at several points to relieve strains. The telescoping tower is made of heavy I-beam sections welded together with strong cross members, and runs on turned rollers fastened to the main frame by machined bosses.

The attachment carriage is made of heavy gusset plate and angle irons securely welded together, and also has turned rollers and bosses which run in the outer channel of the telescoping tower. All attachments fasten to the carriage by means of two long pins which are easily removed. The hydraulic pump

is equipped with ball bearings and is placed under the tractor radiator, out of the way. The power take-off from the front end of the engine operates the loader, independent of the clutch and transmission, and can be disengaged at will if the loader is not being used.

The loaders are made in five sizes, ranging in lifting capacity from 1,500 to 6,000 pounds. Material buckets for use with the loader are made in sizes from  $\frac{1}{3}$  to  $\frac{3}{4}$  cubic yard; the lifting racks, platform and cranes will handle from 1,500 to 6,000-pound loads; the snow buckets' capacities range from  $1\frac{1}{2}$  to 3 cubic yards; and snow plows, bulldozers and angledozers are made to fit any tractor size.

A new folder, describing the Lull Universal loader, contains a number of illustrations showing the loader with lifting rack handling a variety of materials, the material bucket loading black-top, the snow bucket and snow plow in service, and a number of other uses of this versatile unit. Copies of this folder may be secured direct from the manufacturer.



The new Lull Universal loader.

A new method of reinforcing concrete with wood has been invented by a Colombian architect, according to a report from the Office of the Coordinator for Inter-American Affairs. This new technique is being patented under the trade name of Maxbor.

## Ice-Control Methods On Ohio County Roads

(Continued from page 2)

are used on the highways, but because of the unusual situation in which Franklin County finds itself, cinders are used most generally. The Ohio State Penitentiary is located in Columbus and the County Highway Department, several years ago, made arrangements to remove all of the cinders from the penitentiary throughout the year. They are stockpiled in the large yard on Dublin Road, Columbus, back of the county highway offices and repair garage. Here the county operates a grinder for reducing the cinders to a uniform fineness. In three locations in the county bins are provided for storing the treated cinders ready to use on the roads, while in the balance of the county they are stored in stockpiles with 100 pounds of calcium chloride per cubic yard of cinders. In addition a small amount of calcium chloride is spread over the top during very cold weather to take care of any melted snow or rain which might have penetrated the top of the unprotected stockpiles. The bins are used for storing maintenance stone during the summer months.

Each district has a spinner-type spreader which attaches to the back of the cinder truck. Eight of these are Galions and three are All-Purpose spinners. Spare spinners are kept at the county garage for replacement in case of breakdown. The spares include two Hy-Way sanders equipped with Briggs & Stratton motors and two Flink one-man spreaders.

### Personnel

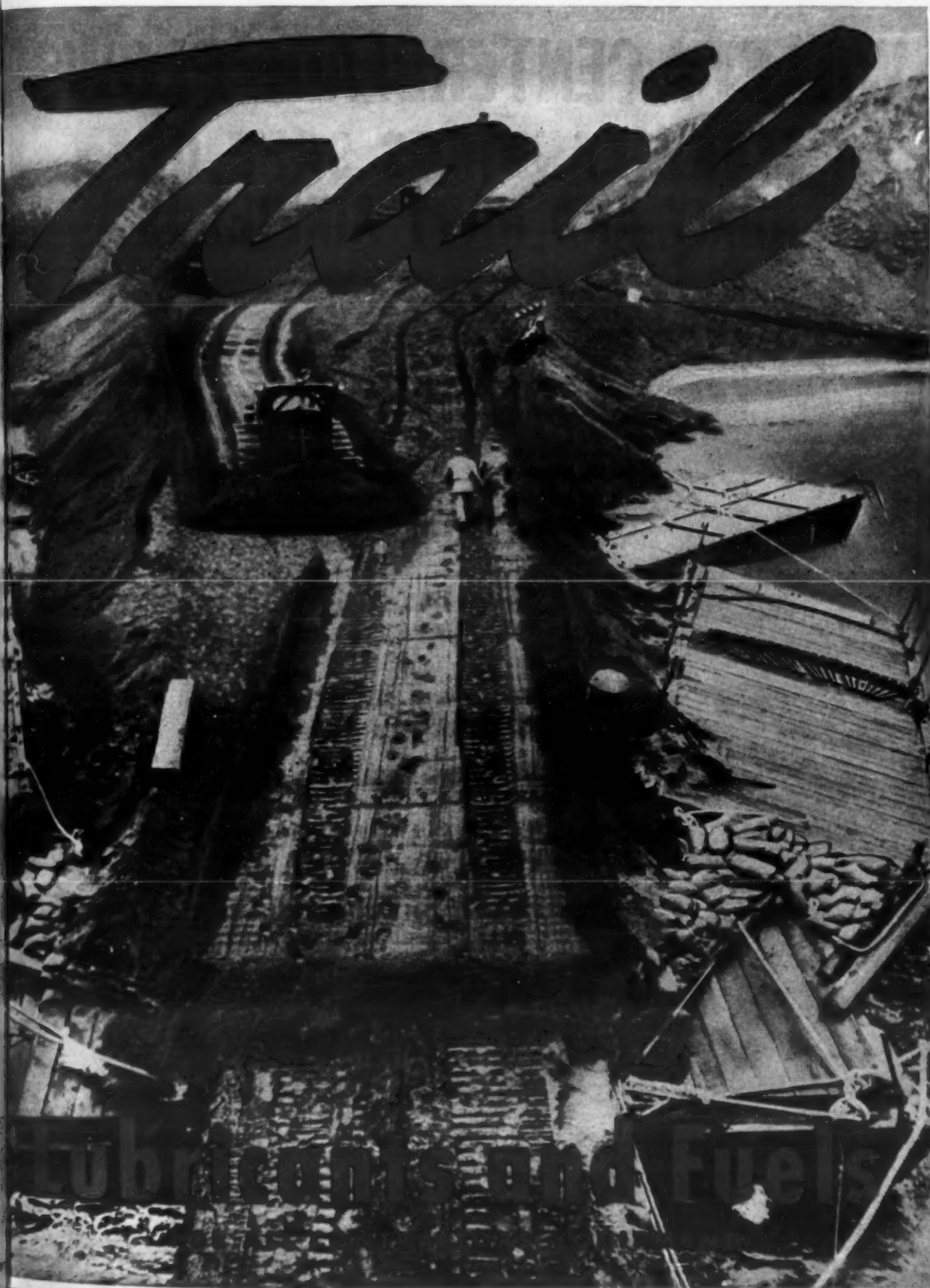
Allan Slade is County Engineer in charge of the Highway Department of Franklin County, Ohio, with Robert F. Koerner, Chief Deputy, in charge of maintenance and snow removal. Ray M. Pilcher is Maintenance Superintendent.

## Forms for Concrete Reusable, Economical

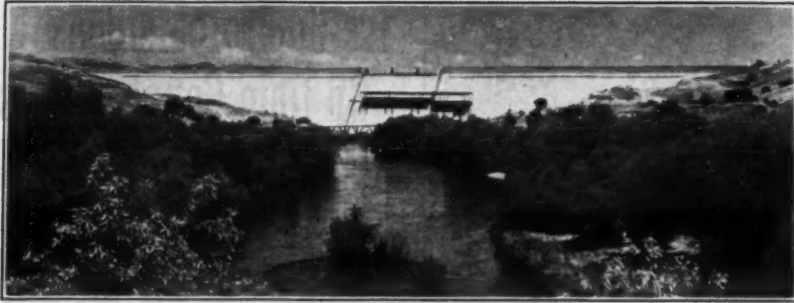
With the restrictions on the use of critical materials, frequent delays in the delivery of essential supplies to construction jobs, and the labor shortage, contractors are working under many handicaps these days. One solution to the problem of handling form work on concrete jobs is offered by the Economy Forms Corp., Des Moines, Iowa. Because its Economy steel forms are available on a rental basis, with all the necessary tools and accessories, and with a trained form crew to set them, contractors may save time, money, labor and headaches through their use, the manufacturer states.

These steel forms are designed for the construction of storage structures, sewage treatment plants, water works, bridges and culverts, tanks, box tunnels, and similar work. The Economy engineering and rental service provides estimates on form labor and materials, form erection drawings for field and office use, all of the steel form equipment needed for the job, including removable spreader ties cut to size, special tools and accessories, trained foremen and plate setters, a follow-up service and daily cost reports. The individual form plates are removable and replaceable for inspection or for placing concrete, and when the forms are to be moved from one set-up to another, they may be handled in large sections by crane, thus saving time in form setting for the next section to be poured.

Further information on Economy steel forms and their rental may be secured by those interested direct from the manufacturer by referring to CONTRACTORS AND ENGINEERS MONTHLY.







Bureau of Reclamation Photo  
Friant Dam on the San Joaquin River in California.

### Friant Dam Will Soon Be Placed in Service

Control over the San Joaquin River in California will soon be exercised by Friant Dam, part of the Bureau of Reclamation's Central Valley Project, and the fourth largest concrete dam in the world. After nearly a year of idleness because of a War Production Board stop-construction order which prevented the manufacture and installation of valves and other control equipment, the dam is to be placed in operation, using valves borrowed from Boulder Dam.

The structure will store water for delivery into the Madera Canal, an additional 11-mile section of which is under construction, and into the Friant-Kern Canal, none of which has been built as yet. Weather permitting, the Bureau of Reclamation will be prepared to make deliveries of irrigation water from Millerton Lake, the reservoir created by the dam, in 1944.

Friant Dam, nearly  $\frac{2}{3}$  mile in length along its crest, will store 520,000 acre-feet of water from the San Joaquin River for irrigation and flood control. The water will be released into the river for downstream consumption and into the canals leading from the dam to supplement existing water supplies for some of the most productive agricultural land in the world.

### For Your Post-War File

Here are some additional publications on various phases of post-war planning which you may like to have in your post-war files. This supplements and continues our previous listings. (See C. & E. M., July, 1943, page 60, and September, 1943, page 23.)

13. "Regional Planning, Part XI, The Southeast", 250 pages,  $9\frac{1}{8}$  x  $11\frac{1}{4}$  inches: another in the series of reports by the National Resources Planning Board, outlining a program of regional development for the Southeast prepared by the Southeastern Regional Planning Commission, and covering all phases of its development, including agriculture, forestry, water resources, housing,

public health, education and recreation. Available from the Superintendent of Documents, Washington, D. C. Price 55 cents.

14. "Industrial Location and National Resources", 260 pages,  $9\frac{1}{8}$  x  $11\frac{1}{8}$  inches: a report by the National Resources Planning Board on the location of industry in the United States, with a view to the post-war problems of readjustment and conversion of industrial

operations to peacetime uses. Available from Superintendent of Documents, Washington, D. C. Price: \$1.50.

15. "Planning Future Construction Markets", 21 pages,  $8\frac{1}{2}$  x 11 inches: a reprint of the addresses and reports presented at the meeting of the Governing and Advisory Boards of the Associated General Contractors of America, Inc., held in Chicago in June, 1943. This pamphlet is designed to provide a program of action for members, chapters, and branches of the AGC and others in the construction industry in planning for future construction. Available from the Associated General Contractors of America, Inc., Munsey Bldg., Washington 4, D. C.

16. "Community Action for Post-War Jobs and Profit", 32 pages, 8 x  $10\frac{5}{8}$  inches: a handbook published by the U. S. Department of Commerce offering a simple easy-to-follow self-help plan for moderate-sized communities to meet the post-war problems of employment and profitable business. It makes definite suggestions for ac-

tion by community leaders and organizations and offers free of charge Guide Sheets for dividing up the work and securing the necessary information on plans and needs of local businesses. Free copies available from the U. S. Department of Commerce, Washington, D. C.

17. "Post-War Construction", 8 pages, 6 x 9 inches: a program of immediate planning for post-war construction as adopted by the Board of Direction of the American Society of Civil Engineers. Copies may be secured direct from the Society, 33 W. 39th St., New York 18, N. Y.

18. "The Effect of Construction on Our National Economy", 29 pages: a reprint of an address by Charles M. Upham, Engineer-Director, American Road Builders' Association, at the Twenty-Seventh Annual Meeting of The Conference Board in New York City. Free copies are available from the A.R.B.A., International Bldg., Washington 4, D. C.

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THE WILLETT CENTERBLADE PLOW, mounted on heavy-duty trucks, cuts ice and hard packed snow off runways, with tremendous hydraulic blade pressure. They maintain level surfaces, approach strips, roads, streets, etc., all year around. WILLETT CENTERBLADE PLOWS are keeping highways smooth and safe for traffic in Defense Areas.

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ALL STEEL HAND HOIST  
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**STANDING ROOM ONLY  
FOR DURATION**

Beebe Bros. All-Steel Hand Hoists carry the highest resale value of any piece of equipment in the world. If you have one not in use, sell it. Many more than are available are urgently needed in the win-the-war program. Thanks.

**BEEBE BROS.**  
2724 6th Ave., So., Seattle 4, Wash.

# Wartime Construction By County of Allegheny

## Another Link in Concrete Route to Improve Traffic Conditions Near Pittsburgh Completed by McCrady

(Photo on page 72)

THE County of Allegheny in western Pennsylvania, one of the wealthiest in the United States, is continuing its program to relieve traffic congestion in the vicinity of Pittsburgh by adding another 6,100 feet of dual-lane concrete highway to the McKnight Road project on which it has been working for several years. Eliminating steel wherever possible, the work has been given priorities which have permitted the acquisition of such small quantities as have been required to allow construction to continue without delays.

Three miles of the project already have been completed and 4 miles, including the contract described in this article, remain, with some bridges, to connect the finished portions with U. S. Route 19; intersecting roads, and with the city. When this new highway is completed, it probably will carry the heavy traffic of that portion of U. S. 19 leading north from the city of Pittsburgh, now a winding and congested route.

### Design

The pavement on the main highway is 24 feet wide laid in two lanes, while on the connecting roads the width of the lanes is reduced to 10 feet. The pairs of lanes are separated by a 6-foot center strip with special curb to prevent vehicles crossing the strip. The pavement is not reinforced nor has it tie bars between slabs nor dowels across the expansion joints. It is poured 10 inches uniform thickness. To make up for the absence of the tie bars, each strip has a triangular key cast in the edge to tie into the adjacent slab or the paved center-strip section.

The out-to-out measurement of the pavement is 54 feet with 13-foot shoulders having a 1-inch-per-foot slope and an underdrain of 6-inch perforated vitrified-clay pipe at the outer edge of the shoulder, or bottom of the ditch, in all cuts. The backslope is 1½ to 1 or variable as the character of the material requires, while the fill slopes are all 1½ to 1.

The center paved gutter is the result of considerable experience with grass and

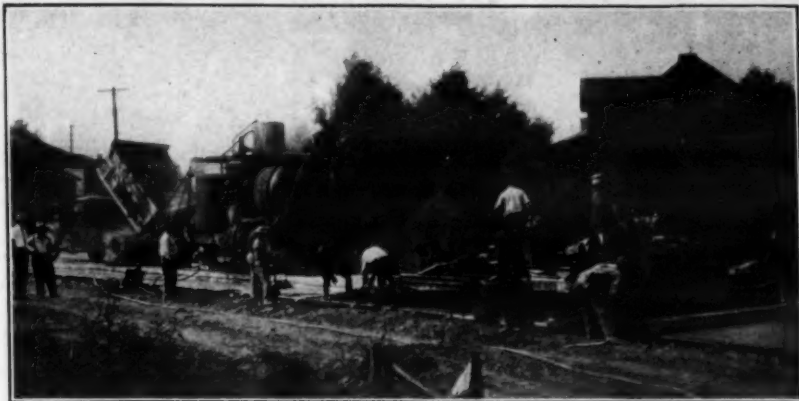
paved center strips or malls. The mall on the first section of this project is a grass center strip with a drain, which requires the expense of mowing during the summer. The next two sections were built with a paved center strip crowned so that rain water or melting snow drained onto the pavement. As this is liable to cause hazardous conditions in winter when thawing is followed by freezing temperatures, the design for the 6,100-foot section described below was changed so that the paved dividing strip drains to the center.

At each edge of the center strip is a curb 8 inches wide and 14 inches high, with long slots for the drainage of water from the highway onto the paved center strip. These slots are 6 inches high and 4 feet 4 inches long with the posts

which support them 8 inches wide. The curb is finished with a 2-inch-radius edge on both sides at the top and a 1-inch chamfer at the openings. The curbs are reinforced with four continuous ½-inch round rods running longi-

tudinally. Two ½-inch round rods 4 inches on centers at 5-foot intervals, at the posts, are looped around the longitudinal rods and are carried down through the posts into the center-strip

(Continued on page 38)



C. & E. M. Photo

A Koshring 27-E paver and finishing machines working on the McCrady Construction Co. section of the McKnight Road project in Allegheny County, Penna.

# When the Seabee Comes Home

Some day he will be back...full of experiences to make your hair stand on end and rarin' to go to work in a peacetime world. He may have run a tractor, a bulldozer, a shovel or crane. Probably he has helped to build bridges, ditches, airfields and roads.

Chances are that somewhere along the way he's learned how a Lorain performs. He's seen them in action or he's worked them himself—unloading supplies and heavy equipment, moving dirt by the ton, digging ditches, preparing gun emplacements—all under conditions that are tougher than you'll ever meet.

We think he'll have a respect for the extra strength and power and speed that is built into Lorains—a respect that agrees with the opinion of hundreds of progressive contractors who say, "Lorains move more material faster, at lower cost."

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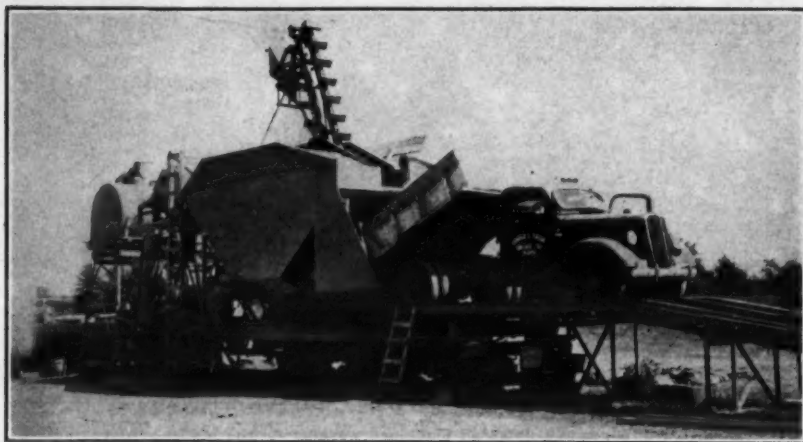
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D-A LUBRICANT CO., Inc.  
INDIANAPOLIS





The C. S. Johnson Porto-Batcher set up for operation.

## New Batching Plant Easily Moved on Job

The feature of the new Johnson Porto-Batcher is its extreme portability, as the unit is easily towed behind a truck from one pouring site to another, thus eliminating long hauls of mixed concrete and centralizing concrete operations. The unit is designed as a complete batching plant to proportion concrete materials for mixing equipment at a minimum handling cost.

When the Porto-Batcher is set up in operating position, it is raised by means of a jack until the towing wheels are clear of the ground. Steel horses are then placed under the four corners to support the weight of the loaded bin. Delivery of the material to the plant is by means of bulk-material trucks which are backed up a ramp and discharged into a receiving hopper from which the aggregate is raised to the storage bin by a bucket elevator. Hauling of the material must be synchronized with the pouring speed, and the number of trucks required depends on the rate of pour and the distance of the source of materials from the plant.

Distribution of the material into the three compartments of the 45-ton capacity bin is by means of a pivoted distributor located at the top of the elevator, the lever controlling this distributor being located at the operator's position with the other operating levers. The aggregate from the three storage compartments reaches the skip through three fill valves located in the bottom of the bin. Each size of aggregate and the cement is weighed on a separate weigh beam. The cement is dumped into a receiving hopper located on the side of the bin and is carried to the skip by a screw conveyor. The cement compartment of the skip is completely sealed to protect the cement from wet aggregate.

After the skip is filled with all material, it is elevated to the charging position by a hydraulic ram and cable assembly and is then discharged into a truck mixer or other mixing equipment. The capacity of the skip is one cubic yard, so that when 2 or 3-cubic yard truck mixers are used, the charged skip

is raised two or three times to fill the mixer.

The operating crew consists of two men, one to direct the unloading of the aggregate trucks and dump the cement, and the second to operate the control

levers, all of which are grouped in a central location.

A new folder illustrating and containing detailed specifications on this new Porto-Batcher may be secured by those interested direct from the C. S. Johnson Co., Champaign, Ill.

## More Scholarships For Latin Americans

Recognition of the valuable work done by the Educational and Pan American Divisions of the American Road Builders' Association has come from the Coordinator of Inter-American Affairs. The ARBA has awarded scholarships annually to aid Latin American students and young engineers in securing both study and practice in the highway field in this country. The thirty recipients of these scholarships in the past 15 years now hold responsible positions in their respective countries.

Under the sponsorship of the ARBA, this plan is to be enlarged with the aid

of the Office of Inter-American Affairs. College graduates will be selected, as heretofore, and given an opportunity to work and study in plants or engineer offices in the United States for periods of one to six months, receiving a nominal salary of \$100 to \$150 a month.

State and county highway departments, contractors and manufacturers interested in aiding this program should write at once to the American Road Builders' Association, International Building, Washington 4, D.C.

## Reilly Manager Dies

Announcement has been made by the Reilly Tar & Chemical Corp., Indianapolis, of the death of John Lee Tildsley, Jr., Manager of its Chicago Branch. Mr. Tildsley, who was 44 years old, joined the International Combustion, Tar & Chemical Co. in 1928 and, when that company was merged with Reilly Tar & Chemical in 1933, was sent to Chicago to take charge of the office in that city.



Official U. S. Army Signal Corps Photograph

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(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)



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# New Treated-Timber Bridge Completed on Alaska Route

## Design and Construction Of Permanent Structure, 584 Feet in Length, Over Fast-Flowing Stream

By S. W. POWELL, Resident Engineer, Public Roads Administration

(Photos on page 72)

THE Alaska Highway crosses the Sikanni Chief River at Army Mile 116 from Fort St. John, British Columbia, approximately 164 miles from the beginning of the highway at Dawson Creek. This river rises in the foothills of the Rocky Mountains to the west of the highway and is fed by the melting snow on the east slope of the mountains. Joining the Fort Nelson River below the Hudson Bay Post at Fort Nelson, the stream at the site of the highway crossing is rapid flowing and at normal water takes a winding course in a channel roughly 200 feet wide. During the winter the stream freezes solid across most of its surface, leaving only a narrow flow, about 6 feet deep, down the main channel which is covered at the deepest point with  $3\frac{1}{2}$  feet of ice.

The temporary one-way log-frame-bent 255-foot bridge built by the Army to carry the Alaska Highway over this stream has now been replaced by the Sikanni Chief River Bridge spanning the river about 50 feet upstream from the temporary structure. The road enters the bridge on a 30-degree curve, and the bridge is skewed 30 degrees upstream on a tangent bearing N 75 degrees 50 minutes W. The approach from the north leaves the highway constructed last year on a 10-degree curve right, follows a tangent for a short distance, then turns left on a 15-degree curve, and enters the bridge on a 78-foot tangent. To lessen the height of the fill on the approach from the north (the west bank of the river) and to gain elevation to climb out of the valley on the east bank, the bridge is constructed on a 3 per cent grade. The deck is 40 feet above high water at midstream, giving a clearance of about 16 feet.

### Design of Bridge

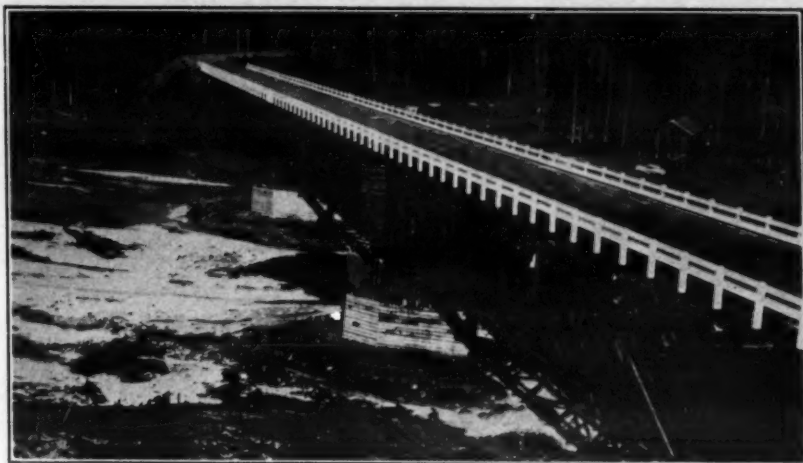
The new bridge consists of three spans, 144 feet center-to-center of piers measured along the grade line of the bridge, with a three-bent pile trestle for the east approach and a five-bent pile trestle for the west approach, making a total length of 584 feet. The roadway is 24 feet wide. Each span consists of four 140-foot deck K trusses, framed with treated Douglas fir timber. Split-

ring connectors were used in framing. The fir timber, which was imported from the United States, was treated with a 50-50 mixture of creosote and petroleum oil before shipment to the job.

Each of the main piers, Nos. 2 and 3, consists of 25 piles, while piers Nos. 1 and 4 each consists of 16 piles. Native spruce piles treated with a water-borne salt preservative were used.

### Substructure Operations

The layout and substructure details were prepared in the office of the Public Roads Administration at Fort St. John. Foundation conditions at the site were



Public Roads Administration Photo  
Looking north along the upstream side of the completed Sikanni Chief River Bridge on the Alaska Highway.

investigated by boring at four points across the channel and by driving two test piles. Surveying and staking of the approaches and piers began in October,

1942, at which time the weather was very mild, about 60 degrees F.

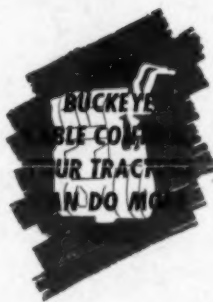
Native spruce timber for the piles for (Continued on page 31)

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Easy-to-reach controls.  
High leverage.  
External clutches and brakes are big, cool running, smooth acting.  
Two decks for mounting fairlead swivel sheaves for better performance on different classes of work.  
Sheaves slue in excess of 180°.



**BUCKEYE Power Control Units** are fast—a touch of the control and the line sings into action. They take hold of the load smoothly and evenly with no jerks, and the sheaves are designed to minimize cable wear—you can use smaller, less expensive cable than with other winches having comparable line pulls. Big clutch and braking area plus external location means cool operation and long life. Center of line pull is low to maintain tractor balance and better traction. Controls are high leverage, within easy reach. You have your choice of Heavy Duty or Medium Duty, single or double, wide or standard drum, models. For all makes and models of tractors. Specification data on request.

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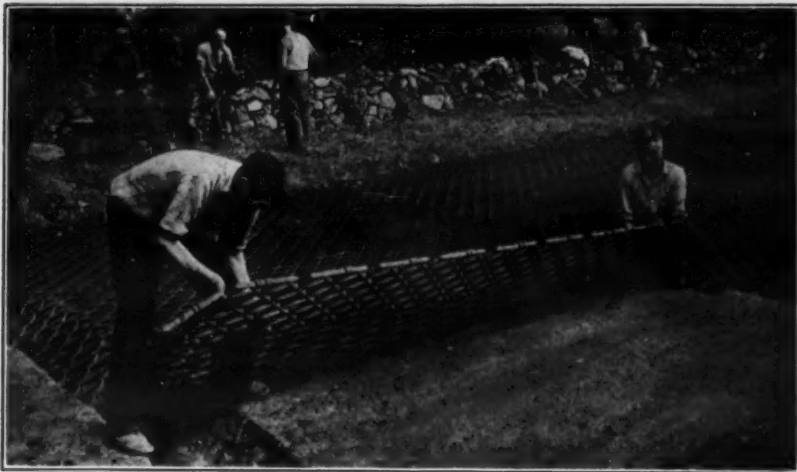


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The first installation of a steel roadway strip to test its practicability for post-war road construction being made in Darien, Conn.

### Steel-Armored Roads Possible After War

The possibility that American motorists may be traveling over steel highways in the post-war period is suggested by a bit of experimental road work recently dedicated in Darien, Conn. The dedication ceremonies, attended by state highway officials and engineers, heralded the experimental installation of a steel roadway strip as "revolutionary and forward looking". The installation, while only 48 feet long and 22 feet wide, is expected to provide an answer as to the practicability of entire highways of steel grid.

The project, which is a joint venture by the town of Darien and the Irving Subway Grating Co., Long Island City, N. Y., is an offshoot of the current practice of constructing landing strips for airplanes in the battle areas. Walter E. Irving, President of the Irving Subway Grating Co., is credited with the invention of this type of portable emergency landing mat.

On the Darien project, the steel grating panels, each 2 x 12½ feet, were placed on the roadway and anchored at the ends for stability. The mesh was filled with sand, and a coating of road oil applied. Walter Bates, Darien Town Highway Engineer, foresees a wide application of this armoring method to secondary roads, particularly in those localities where weather conditions result in frequent wash-outs and other impairments to normal road conditions.

The sponsors of the Darien project feel that this installation will provide a practical test under normal passenger

and truck traffic conditions and that, if successful, it may well set the pattern for a network of steel secondary roads throughout North and South America.

### Ice-Hazard Control On Roads or Runways

"To Skid or Not to Skid?" is the title of a helpful article on the problem of ice control on roads and airport runways this winter which appeared in a recent issue of *Dowflakes*. It points out that ice on highways and airports is a major winter hazard to be combatted continuously, since it stands as a barrier against safe driving and flying. To handle the problem most effectively calls for foresight and careful planning by highway and airport maintenance engineers well before the actual advent of the ice.

Skidproofing icy surfaces can be accomplished by spreading a thin layer of calcium-chloride-treated abrasive over the surface of the ice, the best abrasives being of a hard durable fraction of sandstone, limestone or cinders having a gradation from ¼-inch down to 100-mesh size for highway treatment, and ⅜-inch down to 100-mesh for airport treatment. Oversize material on airport runways, when not properly anchored,

may be a serious hazard in the propeller wash.

Ice removal can be accomplished by making a light application of calcium chloride flake on the icy surface. These flakes, penetrating the depth of the ice, free it from its bond so that it can be bladed off easily. Loosened ice or slush should be removed immediately, as it is a menace to traffic and there is always the danger that a sudden drop in temperature will refreeze the ice. Hard-packed snow may be removed in the same manner as ice.

Full information on the use of calcium chloride in solving the ice problem on highways and at airports this winter may be secured direct from the Dow Chemical Co., Midland, Mich.

### New Keystone Dealer

Announcement has been made by the Keystone Asphalt Products Co., Chicago, Ill., of the appointment of Firtex of New Jersey, Orange, N. J., as a distributor for Keystone products.

## BLOW SAND

### HOLDS NO TERRORS FOR THE "99-M"

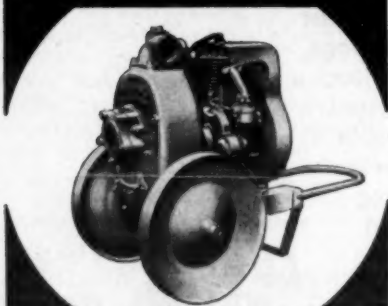


● Building a road through blow sand is probably the most difficult job a motor grader is ever asked to tackle... and there is no tougher sand than that of the famous Dunes at Gary, Indiana. No rear drive motor grader, with its dead front end, has ever succeeded in driving through this sand with blade empty... let alone working in it. The "99-M", with its long

traction base and properly balanced weight and power,

does a beautiful job, and does it so easily as to fool anyone who does not know from practical experience what it means to try to build a road in sand... if you are faced with the problem of grading roads in sand... if you have tried ordinary motor graders and found them wanting... you will find the "99-M" the complete solution to your problem. THE AUSTIN-WESTERN ROAD MACHINERY Co., Aurora, Illinois, U. S. A.

### JAEGER "SURE PRIME"



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with up to 5 times faster priming, with hi-head, hi-capacity performance, with thousands of extra hours of trouble-free service.

Self-cleaning design, replaceable liners, longest life seal, heavy duty construction thruout.

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Sizes 3000 to over 200,000 G.P.H.

52 Lb. Benton 3000 G.P.H. THE JAEGER MACHINE CO. 701 Dublin Ave., Columbus, Ohio



A motor grader without power on the front wheels is like a draft horse with roller skates on his front feet.





# Speed, Load and Care Control Vehicle Life

**Ohio Highway Department Governs Speed, Limits Load And Has Well-Integrated System of Vehicle Care**

(Photo on page 72)

A CAREFULLY planned program of preventive maintenance that had its inception, some time before the war, in one of the District Shops of the Ohio Department of Highways is now paying real dividends in keeping necessary motor trucks and passenger cars running on essential highway work. Under the Motor Transport Division, organized in 1933, Ohio is experiencing the thrill of state-owned equipment paying for itself and, through a motor-car pool at Columbus, other state departments have been able to dispense with motor cars and now use MTD cars on a rental basis.

The preventive maintenance program established several years ago is now a feature of truck and car servicing in every state highway garage in Ohio. A 1,000-mile inspection is made at the county garages and the 5,000-mile check-up at the Division garages.

## Equipment Servicing

Truck and passenger-car drivers are instructed to report mechanical defects noted when driving their vehicles. This is more essential in truck operation than in passenger cars because it is more expensive to repair a truck which gets much harder service. Further, the lay-up time or loss of service of a truck is much more expensive. The driver of each truck puts a note on the windshield if there is anything the matter with the truck. The night garage man checks on the trouble, and if it is more than he can handle by a slight adjustment, the truck is withheld from service and turned over to the day mechanic for such adjustment and repair as may be necessary. Ohio has trained a group of women drivers in one of the Divisions for service during emergencies and in readiness to make up any further loss of personnel caused by the draft and by drivers entering the heavier services in some of the war industries. The extension of this program to other Divisions is under consideration.

The Equipment Inspection Card, MT. 46, is printed on a fairly heavy manila board so that it can be easily handled by the mechanic inspecting the truck or passenger car. This form contains space for the entry of the number of the piece of equipment, the date and the repair order number, the make and type of equipment, the speedometer reading, and the year and model of the vehicle, as well as the name of the operator. In the left-hand column are 31 items required for the 1,000-mile maintenance inspection, and in the column at the right are 23 additional items which are included in all 5,000-mile maintenance inspections.

The 1,000-mile maintenance inspection covers:

1. All items indicated on the Operator's Report since the last inspection, which must be checked and the necessary repairs and adjustments made.
2. Wash.
3. Clean engine, engine compartment and the inside of the cab.
4. Lubricate.
5. Change the motor oil, except on engines equipped with filters.
6. Check the oil filter.
7. Inflate the tires and replace damaged or "worn-out" tires, also replace missing valve caps and hub caps.
8. Check for oil leaks.
9. Check water pump.
10. Check fan belt and adjust or replace, if necessary.
11. Service the engine air cleaner.
12. Clean the crankcase breather.
13. Check the oil pressure.
14. Check the generator charging rate.
15. Check the fuel tank and lines for leakage.
16. Check the transmission-oil level.
17. Check the rear-axle oil level.
18. Check the clutch and free pedal travel.
19. Check universal joints.
20. Check steering gear and linkage.
21. Check wheels, studs, lugs and axle nuts.
22. Check brakes and adjust if necessary.
23. Check speedometer.
24. Check battery, test and record the specific gravity of the three cells.
25. Check all lights.
26. Check windshield wiper and rear mirror.



One of the Division Garages of the Ohio Department of Highways where the 5,000-mile check-up of motor equipment is made.

27. Check starter and horn.
28. Check cab glass.
29. Inspect door-check straps.
30. Inspect door latches and hood fasteners.
31. Check fire extinguisher and first-aid kit.

The additional items required for the 5,000-mile maintenance inspection include:

1. Check radiator and cooling system for leaks.
2. Inspect radiator hose.
3. Inspect cylinder-head bolts and tighten with torque wrench only.
4. Inspect manifolds and exhaust system.
5. Check valve clearance.
6. Clean sediment trap and fuel screens.
7. Inspect carburetor.

8. Resurface, align and adjust distributor points.
9. Test and record engine compression for each cylinder.
10. Check ignition and timing.
11. Clean and adjust spark plugs.
12. Check front-wheel alignment.
13. Clean battery.
14. Inspect battery connections and ground wire.
15. Tighten all cab, body and engine bolts.
16. Test dump-body hoist.
17. Inspect hoist pump and pump drive.
18. Inspect hoist linkage and body hinges.
19. Tighten all spring clips.
20. Inspect all spring shackles.
21. Tighten differential carrier bolts.
22. Make road test and observe general performance.
23. Test the governed speed and record in miles per hour.

(Continued on page 52)

## Care Every Day Keeps the Scrap Yard Away!

Hough Shovels are scarce—even in government departments. Therefore, every care should be taken to maintain your equipment for maximum service life.

Here are suggestions: Change your oil filters every 400 hours. . . . Keep wear strips and guide frames well greased. . . . Use only clean SAE 10 oil (U. S. Engineers OE10). . . . Don't forget, a noisy pump means wear—it's caused by a choked intake line. . . . Keep cable tension equalized and be sure to replace cables as soon as strands become frayed. . . . Keep cutting edges sharp for faster digging. . . . Hardface for maximum service life. . . . Use bucket teeth for digging clay and shale; wide buckets for re-handling work. Hough equipment is made to last a long time with average care and attention.

# HOUGH

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Tractor Shovels and Road Sweepers



## Get More Out of Your Hough Shovels By Broader Application

Use them to load machinery parts on trucks—To set lighting standards and fire hydrants—To hoist machinery for wall and ceiling installation—To haul and dump mixed concrete into forms—For tree removal and loading—For

boosting wagon scrapers and trucks—For pulling poles, posts and shoring. They're handy, readily maneuverable and have hundreds of time-saving applications. Tractor is of course available for other operation at all times.

• THE FRANK G. HOUGH CO. Libertyville, Illinois •

## SAND'S-STEVEN'S Line & Surface LEVEL



Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

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C. & E. M. Photo  
An orchard cultivator pulled by a Cletree on dry mix of sand and cement. Just ahead is a disk harrow on the same operation.

## Runway Extensions On New Flight Strip

(Continued from page 1)

950 feet long and 30 feet wide the first working day but, by rapidly increased efficiency, this time was soon reduced to a 10-hour day. Considerable difficulty was experienced with the equipment working down into the soil-cement mixture during operations because of the non-cohesive character of the sand until it began to set up with the cement. Another difficulty in the operation was the speed with which the water placed on top for mixing drained through the sand-and-cement mix to the bottom. The apparent loss in this manner was far greater than the usual loss under a hot sun and drying wind on most jobs. During the mixing operation, however, the wetter material was brought to the top, and little excess water had to be added to make up for this apparent loss through the mix.

### The Water Supply

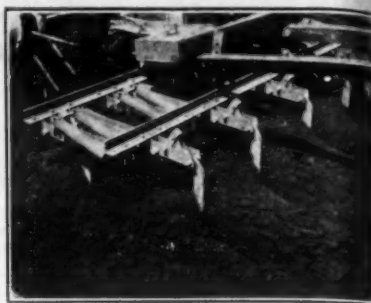
The job was beyond any available city supply and not near any stream, so that the cost of supplying water by long hauls would have run into prohibitive figures. The contractor decided to depend on driven wells. Consequently a large open pit was dug 50 feet in diameter and 12 feet deep with a dragline. This was deepened another 5 feet, reduced to 24 feet in diameter, lined with cement blocks, and inside this it was put down another 4 feet with a diameter of

16 feet, also lined with the blocks. Inside this area six 2-inch wellpoints were driven at depths varying from 32 to 62 feet below ground surface to draw water from different water-bearing strata.

A Buick 1933 engine was used to drive

a pair of Westco turbine pumps through a triple V-belt to deliver water to a 3,000-gallon closed horizontal tank set up on the roadway nearby. Gasoline drums for the engine were placed on the bottom pit and above to feed by gravity. The outfit pumped continuously to the tank, creating a pressure against the trapped air so that when the tank trucks arrived for loads, they could be filled with 1,000 gallons through a 2½-inch pipe in 4 minutes. To protect the pump installation from both sun and rain, it was covered with a tent-like structure of Homasote board.

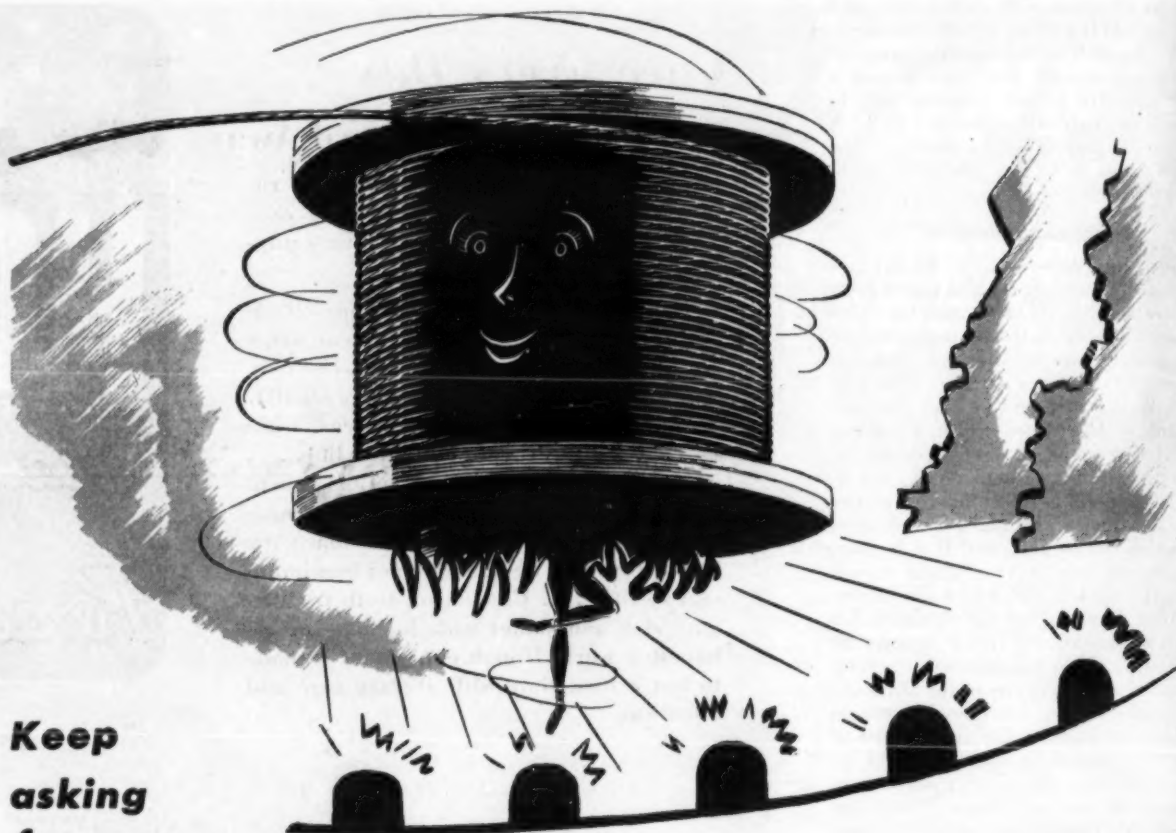
The water-hauling equipment was a marvel of ingenuity. Try to buy steel tanks these days, or better still try to buy a tank truck! Even all the old wooden watering carts of bygone days had disappeared from this vicinity, so the contractor had to turn to using a truck-mixer as a tank truck, with the end welded to prevent loss of the water. This held 975 gallons and was served by a Gorman-Rupp Bantam pump to give the required pressure for the application of



C. & E. M. Photo  
Close-up of the wet mix of the sand-cement runway extension with the cultivator shown turning the material.

the water. The second tank truck was an old flat-body truck with a 1,200-gallon steel tank blocked up on one side of the body and a Novo portable pump securely fastened to the bed at the other side for pressure. It delivered the water through a wide sweeping rubber hose to a 12-foot spray bar attached at the back. The third tank truck was a 1,050-

(Continued on next page)



## AMERICAN CABLE TRU-LAY PREFORMED WIRE ROPE

• No doubt you have many times seen a wire rope winding itself on a drum in a slipshod, crisscross manner. TRU-LAY PREFORMED strongly resists that tendency, even under light loads at high speed. Spooling on a drum evenly, smoothly, properly, means less nicking, scarfing and crushing. That means longer life and better service from your TRU-LAY PREFORMED.

This is just one of the advantages built into American Cable TRU-LAY PREFORMED—at the mill. Just one of the reasons why TRU-LAY PREFORMED wire rope is preferred by so many operators. Specify it for your next line. It will steady your machine production; save you time, accidents, and money.

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BRIDGEPORT, CONNECTICUT



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better!

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Forces took  
so much of our  
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**ALLIED STEEL PRODUCTS, INC.**

N. B. C. Bldg.

Cleveland 14, Ohio



## Mixing Sand-Cement On Flight-Strip Job

(Continued from preceding page)

gallon tank mounted similarly on another truck for gravity feed to a spray bar. These trucks made the 1-mile haul and filled up with sufficient speed to keep the strip being mixed supplied with the required 8 per cent water. Two thirds of this was applied as mixing started and then the balance in small increments as the work continued.

### Preparing for Mixing

On the first outside strips, pieces of 6 x 6-inch lumber 16 feet long were laid as forms on both sides of the strip, while all succeeding strips had only one line of the form lumber, as the adjacent completed strip acted as the form on the other side.

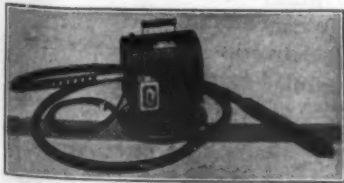
The cement was first received in bulk and a novel scheme developed for spreading it. A Traxcavator unloaded standard dump trucks driven onto a ramp, and then carried the load of cement to a home-made spreader set to lay down the cement in the right thickness over a 10-foot width. It was found that this system was too slow for the work, as the pair of spreader boxes were sitting idle most of the time waiting for the delivery of cement. If the material had been sufficiently stable to permit driving the trucks right up to the spreader boxes, or if the contractor had had two or three Traxcavators available, the system would have worked admirably.

A shift to bag cement was made and the bags delivered to the site by truck and spotted in ten rows with the bags 5½ feet apart longitudinally. Six men were used in the cars at the local freight spur to unload the bags from the cars to the trucks, and six more for spotting. Extra bags were stored on the job on boards and covered with tarpaulin to protect them from ground moisture and rain.

From 12 to 20 men were used to empty the bags over the strip to be mixed. Six of the men slit the bags on one side and turned them over, and the remaining men spread the cement as evenly as possible in emptying them. The crew then spread the cement uniformly with hand shovels, and finally a spike-tooth harrow was pulled over the area to complete the spreading. The placing and spreading operations took about 1½ hours.

### Mixing Operations

The initial mixing operation was to pull a single plow the length of the strip on the outside to turn the material away from the edge, as the mixing worked it toward the edge. The plow was pulled by one of the small tractors, Farmall, Cletrac, or Caterpillar. A Caterpillar No. 12 power grader was also used during the mixing operations to pull excess material away from the sides and throw it toward the center.



### Concrete VIBRATORS AND GRINDERS

Write for Circular on types, sizes and prices

White Mfg. Co.

ELKHART

INDIANA

The actual mixing was done by a double disk harrow, two orchard cultivators, and a large spring-tooth harrow. The dry mixing required about 3 hours of continuous operation on the 950 x 30-foot strip. As soon as the material showed a uniform color and mix on careful examination, the first water truck was pulled over the loose material by a Caterpillar Thirty tractor. Each of the trucks delivered their loads in like manner until two thirds of the required water had been added. It required one hour to get the initial application of water into the mix.

Wet mixing by the same equipment as was used for the dry mixing was started immediately behind the first tank truck. Four men worked along the edge, hand-shoveling the material that spilled over the forms or onto the adjacent strip and also culling all stones over 1½-inch. The walking plow was used several times during the wet mix to bring up the bottom material at the edges and also to cast it away from the edge to permit thorough mixing. The wet mixing operation required about 4½ hours.

### Compaction

The contractor tried sheepfoot tampers for the compaction as recommended in the soil-cement manuals, but they were useless in this sandy material. The compaction was done largely by the ac-

tion of the crawler tractors, the vibration of the equipment having a decided stabilizing effect on the granular material. The rolling was completed by rubber-tired equipment supplemented by a novel adaptation of the pneumatic-tired roller. The contractor took four rear

(Concluded on page 59)



C. & E. M. Photo

A Farmall tractor pulling a single plow to clear the sand-cement mix from the edge of the adjacent lane.

## HERE'S A FIGHTER THAT CAN HELP



**H**AVE you ever thought of your Cletrac dealer as a "fighter" who can help you keep your fighting equipment fit to fight?

Your Cletrac is a fighting machine—to be kept in fighting trim by frequent inspection, correct lubrication and proper tune-up.

Doubtless you know your Cletrac dealer pretty well, but have you kept in touch with him in the war-time maintenance of your Cletracs?

Here's how your Cletrac dealer stands ready

to help you get the most from your equipment:

1. Assist you in making out the necessary forms required under government regulations to secure any vital repair parts.
2. Supply trained, expert service men who will aid you in maintaining and repairing your Cletracs so that they provide dependable, economical performance.
3. Give you the benefit of his years of experience in sound advice, and help you do what often seems impossible in keeping equipment working.

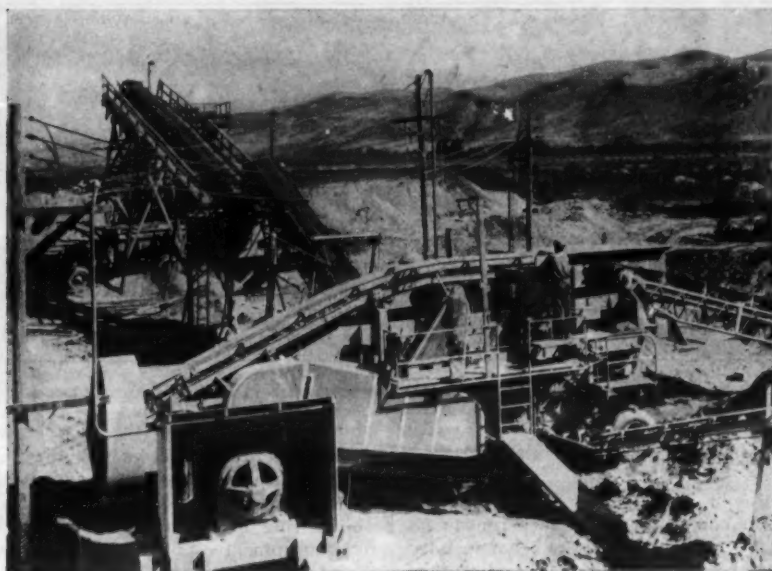
You'll find, too, that he carries an adequate stock of parts as war conditions permit.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND, OHIO

# CLETRAC CRAWLER TRACTORS

GASOLINE OR DIESEL





The Cedarapids Master Tandem portable gravel plant.

### New Crushing Plant For Gravel and Rock

High plant capacity, mobility, and versatility are features of the Cedarapids Master Tandem portable crushing plant made by the Iowa Mfg. Co., Cedar Rapids, Iowa. Although primarily a gravel plant, it can be used for quarry work by placing a primary crusher ahead of the master unit. By adding sprays, washing screen, and settling tank, the unit becomes a complete crushing, washing and screening plant, capable of producing aggregate of virtually any specification.

Engineered for smooth efficient operation, the Master Tandem consists of matched-output jaw and roll crushers, screen, and conveyors. It is highly mobile, meeting all highway transportation requirements, and is easily maneuvered, the manufacturer states. It rides on six cast disk wheels equipped with dual pneumatic tires, and has four-wheel brakes.

The principle of operation of this Cedarapids plant is to keep material moving in a continuous flow from shovel to truck or storage. From the 30-inch x 50-foot feed conveyor, the material drops to a 30-inch feeder which delivers it to a 48-inch x 12-foot double-deck horizontal vibrating screen. The largest oversize goes to a 10 x 36-inch jaw crusher; the next oversize to a 40 x 20-inch roll

aggregate delivery conveyor. Material from the roll and jaw crushers drops onto a 24-inch x 14-foot conveyor which carries it to a raff wheel for elevation to a 24-inch x 25-foot conveyor. Crushed material is then returned to the vibrating screen for grading.

Further information on this Cedarapids plant providing both capacity and mobility may be secured direct from the manufacturer. Just mention this item.

### Check System Aids Proper Lubrication

The Chek-Chart system for automotive lubrication, developed by the Chek-Chart Corp. primarily for use by service stations and large truck fleet operators, is equally adaptable for use by contractors who own large numbers of automotive equipment and by state and county highway departments.

This Chek-Chart service provides not only lubrication diagrams and charts for all types of automotive equipment

which have been carefully worked out with the various manufacturers of the units, but also provides a consulting service which places the Chek-Chart staff at the user's disposal to aid in developing a special lubrication program to meet any particular problems.

Included in the Chek-Chart system are a series of wall charts providing all essential data on motor-oil and gear lubricant recommendations; crankcase, transmission and differential, cooling system and gas-tank capacities; and the capacities and lubricant recommendations for overdrives, and automatic transmissions. Another aid is the volume "Service Man's Guide to Automotive Lubrication" which has recently been revised, with new chapters on truck and tractor lubrication.

Further information on this service and how it can help to keep present equipment on the job by aiding in its regular and proper lubrication may be secured direct from the Chek-Chart Corp., 624 So. Michigan Ave., Chicago 5, Ill., by mentioning this item.

## ATHEY FORGED-TRAK WHEELS GIVE YOUR LOADS

**PAVEMENTS OF STEEL**

*Somewhere in the Aleutian Islands this team of Athey Trailers, pulled by a "Caterpillar" Diesel Tractor builds a landing field on wet sand beaches.*

*In Mud, Sand OR LOOSE EARTH*

It's not always fair weather in the earth-moving business and the wise contractor is equipped to keep production going—in weather good or bad! He uses Athey Forged-Trak Trailers and "Caterpillar" Diesel Tractors because heavy loads are supported on smooth, all-weather "pavements of steel" with these dependable earthmoving units.

On soft sand beaches, or new earth fills, where projects are running against time, and delays must be avoided, these all-job trailers are especially essential. They roll heavy loads on schedule and keep production maintained. Their broad-surfaced, steel tracks, built for long life and economical operation, help compact the footing on which loads are hauled.

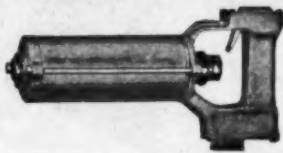
The need for road maintenance machines in building and maintaining haul roads is greatly reduced with Athey Trailers.

They lay their own roads—roads of steel—as they go. Thus, there's the saving of machines and men, both of which are in urgent demand in the war effort.

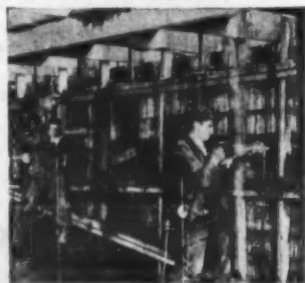
More and more contractors are finding that Athey equipment is job insurance—that they're time and money ahead with these reliable steel tracks under their loads. Have your Athey-"Caterpillar" Dealer give you facts concerning Athey products and about deliveries on new machines. He will be glad to serve you. Athey Truss Wheel Co., Chicago, Illinois.

**ATHEY**  
*Forged-Trak Wheels*

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# County Wartime Maintenance Fights Floods and Freezes

**Tippecanoe County Loses Some Culverts and Roads; Post-War Projects Will Strengthen Road System**

By THEODORE REED KENDALL, Editor

† LOCATED in northern Indiana, Tippecanoe County has a number of flashy streams crossing it which, during the excessive rains of the spring of 1943, damaged roads in Indiana, Illinois, and other states in the upper Mississippi Valley. These floods washed out a number of county roads, although no bridges were lost. Added to this were a series of temperature changes in late winter which weakened the roads carrying heavy war traffic, resulting in severe damage. These acts of Nature disrupted traffic temporarily and added to the determination of the county to strengthen its entire road system with heavier surfaces as soon as the present war stringencies can be relaxed.

## Floods and Freezes

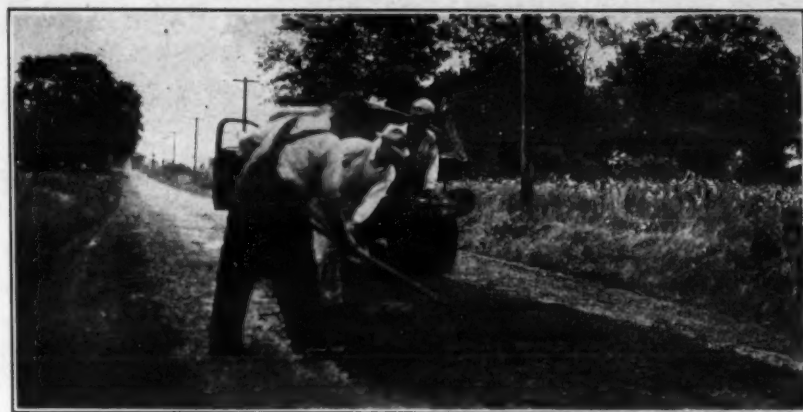
Because of the flashy streams, there were three bad washouts east of Lafayette, the county seat of Tippecanoe County. There was a total of between fifty and sixty washouts throughout the county and a loss of fourteen culverts, but no bridges, although several of the bridges were isolated. At one point a brooder house was carried down a stream and clogged a 24-inch culvert, resulting in the washing out of 2,000 cubic yards of fill.

After a rather severe winter there was a complete thaw around March 1 as a result of a heavy rain, and then by March 5 the temperature had dropped to zero. This caused a great deal of damage to roads, breaking the surface mat over a soft subgrade so that heavy traffic, which included milk trucks and trucks hauling from the hammermills which do custom grinding, broke through the surface. If there had been sufficient other paved roads so that the county roads

could have been closed to heavy traffic for thirty days, they could have been saved. Because of this experience, the county is definitely planning to double its expenditure per mile of road for a surface mat, increasing it from \$2,500 to \$5,000 per mile, which will minimize damage caused by such conditions as existed early in March. This is planned for its post-war program.

## County Organization

State laws covering Indiana county organization as well as financing have been changed in recent years and, according to most officials, have not improved the



C. & E. M. Photo  
Placing a Precote patch on a Tippecanoe County, Ind., road as part of the regular county maintenance program.

situation. The earlier county law gave the County Board of Commissioners the right to appoint a County Road Superintendent for a period of four years, and the County Surveyor was elected for two years. Under the new law the county

commissioners can make the county surveyor responsible for the construction and maintenance of county roads or they may appoint a County Road Supervisor. The County Surveyor has charge of the  
(Continued on page 46)

# FLYING FIELDS or



# COLLEGE CAMPUS

## Case Power Sees Things Through

ON campus walks and drives, where students in wierd attire were wont to stroll, youths in uniform now march in measured cadence. But war has not changed the weather, nor the certainty that it will bring a problem of snow removal... a problem all the more serious when labor is scarce.

Not only on school and college grounds, but in industrial plants, transportation terminals, parks and cemeteries, on crowded city streets and on rural by-ways Case-powered plows are saving money and manpower as they keep ways open and traffic moving. Sharp twists and turns, steep slopes and blind ends, all emphasize the extra maneuverability that comes from the compactness, easy

handling, and inherent stability of Case industrial tractors.

At airports and flying fields these versatile power plants do a still more difficult, more critical job. Here plowing alone is not enough, because steel blades cannot conform to the contour of concrete or stabilized soil and make the runways completely clean. So Case tractors with power-driven rotary brushes, like Paul Bunyan with a giant broom, sweep away the snow.

Besides his broom, this modern Bunyan has a shovel. With hydraulically-actuated loaders Case industrial tractors scoop up the snow at intersections, bus stops and loading zones, hoisting it into trucks for hauling or piling it out of the way. Compact, nimble-footed, they work in crowded

traffic and cramped quarters where ponderous outfits would be out of place.

In summer these same Case tractors keep grass clipped, gutters swept. They pull graders, mixers, asphalt kettles. With loaders, cranes and winches they handle earth, lift and carry heavy objects, uproot stumps. In every job, the endurance for which Case power is known enables them to carry on with a minimum of attendance and maintenance.

Case industrial tractors are built in four basic sizes, with varied equipment to cover a weight range from 2500 to 10,000 pounds. For your power plans, and for immediate needs of essential sort, see your Case distributor. J. I. Case Co., Racine, Wis.

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**CASE**



KEEP ROADS OPEN...  
TO KEEP AMERICA MOVING





One of the White traffic strippers used by the State Highway Commission of Indiana for painting traffic lines on its highways.

## Reflectorized Line For No-Passing Zone

In 1939, after more than a year of tests on state highways, Indiana adopted the reflectorized yellow stripe for no-passing zones and shortly thereafter, a specialized use of white reflectorized bands outlining the "RR" indicating railroad crossings. A yellow barrier stripe 4 inches wide is used on either side of the true center stripe of black asphalt paint on vertical curves over hills or horizontal curves in the highway where the sight distance is less than 750 feet, using an instrument height of 9 feet for the target in testing all vertical curves.

The standard yellow paint is processed at the State Prison and is applied, with the Prismo beads, by the regular state maintenance crews using White narrow traffic-line strippers. There are two operators on each machine, a driver for the servicing truck from which one man drops the caution flag over the fresh stripe, and which also carries the supply of paint and Prismo beads, two flagmen to hold down the speed of passing traffic, and one laborer.

One gallon of paint completes a stripe 4 inches wide and 300 feet long and requires 6 pounds of beads to give a satisfactory reflecting effect. Any reduction in the amount of paint for this area, or a lengthening of the stripe for the same volume of paint, or the use of more or less beads greatly reduces the effectiveness and life of the stripe.

The initial cost of the reflectorized stripe is higher than a straight painting job with the same motorized striping machine. The distinctness of the warning line under the headlights is ample

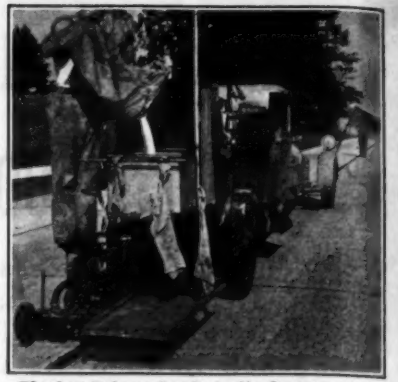
stripe is made up largely of the labor cost so that the extra initial cost of the reflectorized stripe is the slight added cost of materials, but it does not have to be renewed as frequently as the straight painting; in fact two years or more is the usual effective life of the reflectorized stripe against five to six months for the traffic paint.

Indiana has shown remarkable restraint in the use of reflectorized stripes, confining them to the special warning services described so that they continue to serve as real warning stripes, both day and night. If the reflectorized stripes in yellow, or any other color, were used for the continuous center stripe their psychological effectiveness would be lost.

Samuel C. Hadden is Chairman, State Highway Commission of Indiana, and Norman F. Schafer is Superintendent of Maintenance.

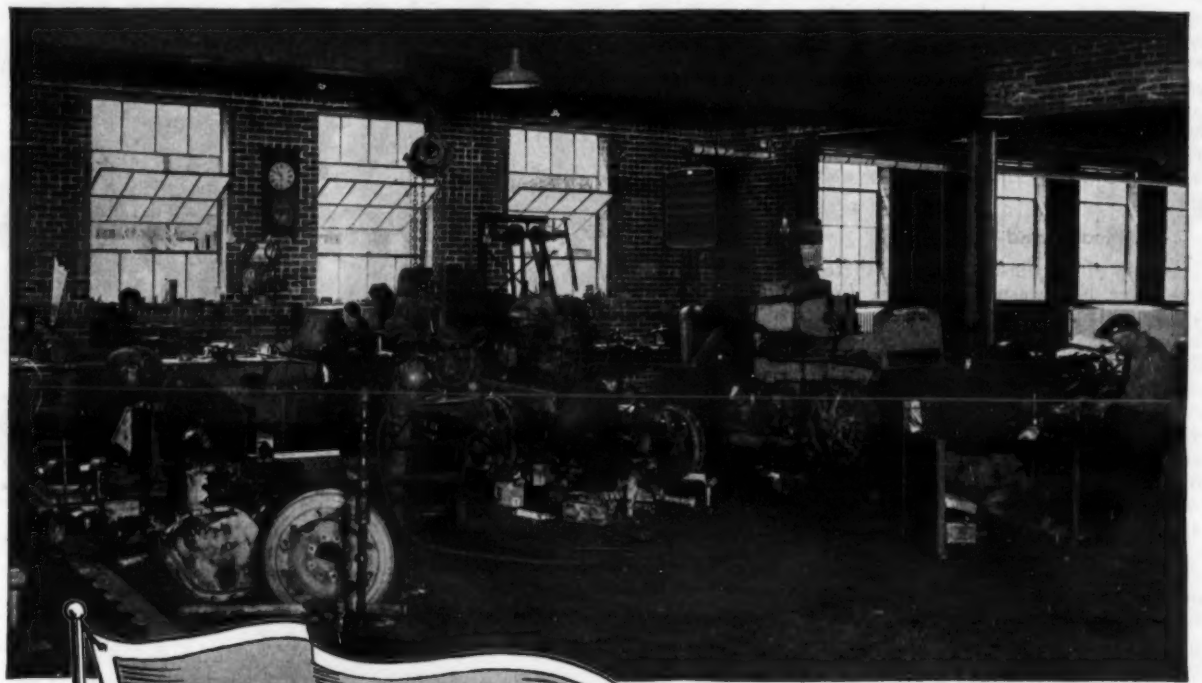
## Paint Spraying Rules

A new wall chart of paint spraying rules, showing how to save paint, air,



Placing Prismo beads in the hopper of a traffic stripe laying reflectorized traffic lines on an Indiana road.

time, power, fuel, and equipment, has been published by the Eclipse Air Brush Co., 400 Park Ave., Newark 7, N. J. These rules apply to all types of paint spray equipment, not just to that made by Eclipse. Copies of this chart may be secured free direct from the company.



## Stand for SCHEDULED SERVICE by SKILLED SPECIALISTS

WHEN will you be able to spare your International Industrial Equipment for service work this fall and winter? That question takes planning in advance.

The International Industrial Power dealer is working on a tight service schedule. He has a big job on his hands keeping heavy-duty equipment in his territory in good running order. On the other hand, it is vital that your equipment be idle as few working hours as possible.

SCHEDULED SERVICE is the answer—the program International dealers are following to take care of everyone in the shortest possible time.

1. Tell the dealer as far in advance as possible what overhaul you need done, what equipment will need

servicing, and when you can bring it in for service.

2. Tell him what new parts you will need, so they can be ordered in advance.

3. Make minor repairs yourself, so the dealer's servicemen will have more time for urgent, major overhaul.

The International dealer has the shop facilities, the skilled workmen, and the precision tools to handle service work with the least expenditure of money and war-needed metals. Let him help you keep your International TracTracTors, Wheel Tractors, Power Units, and allied equipment on the job.

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## Roadside Development Reports Now Available

The reports and special papers of the Committee on Roadside Development which were presented at the Twenty-Second Annual Meeting of the Highway Research Board held in St. Louis last year are now available in paper-bound mimeographed form. The volume includes the report of the Committee's Chairman, H. J. Neale, Landscape Engineer, Virginia Department of High-

ways; the Divisional Committee reports and special papers; and, as appendices, various other material of interest to landscape and roadside development engineers, including an annotated bibliography on Flight Strips, and a report on seeding operations and slope protection on the Pennsylvania Turnpike.

The Divisional Committee reports and papers cover three general subjects: design, right-of-way and border control; construction and maintenance; and education, evaluation and public relations.

Copies of this volume, which was edited by Fred Burggraf, Assistant Director, Highway Research Board, may be secured by interested landscape architects and roadside development engineers direct from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. Price: \$1.00.

## Safe Fuse Pullers

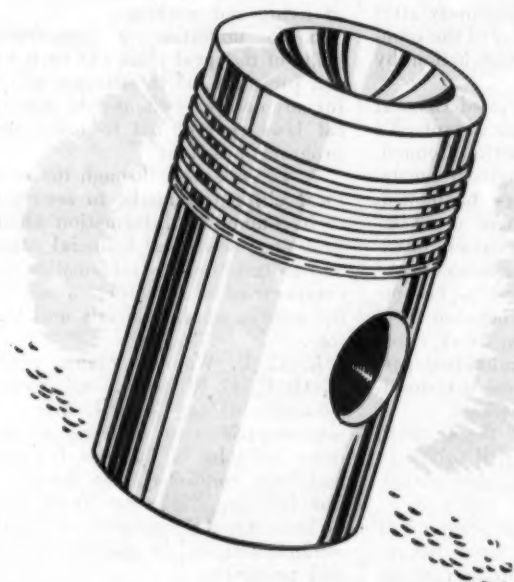
The Ideal Safe-T-Grip fuse puller, made by the Ideal Commutator Dresser

Co., 1288 Park Ave., Sycamore, Ill., is an inexpensive pocket-size tool for pulling and replacing fuses. Made of completely insulated fibre material, it eliminates the danger of electric shock in handling "live" electric parts, and its design provides a firm easy hold for speed and convenience.

A new folder, describing and illustrating the Safe-T-Grip fuse puller, may be secured by those interested direct from the manufacturer. Just mention this item.

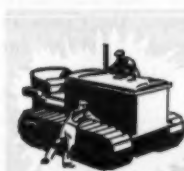


You can buy a new shirt in 10 minutes . . .



but it may take weeks to replace a scored piston

The answer is  
**Preventive Maintenance**  
now with Shell  
**Diesel Lubricants**



When a high-speed Diesel overheats and "seizes" you've got trouble on your hands, with a long "time out" while you wait for parts to arrive and repairs to be made. Such delays are bothersome, costly.

Under today's extreme operating conditions, more than usual care should be taken to make sure your Diesels are properly lubricated. This means periodic check-ups made at more frequent intervals. They may take time, yes. But the few minutes they do take will be well spent when you compare them with costly delays such check-ups can save you.

Don't you wait for trouble to remind you that it's time to lubricate. Call in the Shell man now. Let him help you plan your Preventive Maintenance.



**SHELL DIESEL LUBRICANTS**  
**AND SHELL "DIESELINE"**



## Contractors Prepare Their Post-War Plans

(Continued from page 2)

### Contractor Associations

Organizations of contractors and road builders throughout the country have already gone to work in a practical fashion to prepare for the post-war period. Many of them have set up definite programs and are working with local and state engineers in surveys of needed public-works projects; others have instituted excellent public-relations and educational programs for citizens at large, to inform the taxpayer of the importance of action now if essential construction is to be started promptly after the war and to remind them of the economy and efficiency of construction by contract.

For example, the Associated General Contractors of Missouri has organized a Citizens Post-War Construction Council, made up of contractors, engineers, material and equipment dealers, bond men, and public officials. Where organizations or associations were already in existence, such as engineers' and architects' societies, they were invited to become a part of the Council; where no associations were in existence, every effort was made to invite all individual persons or firms whose business is connected with construction in Missouri.

The main objectives of the Council, and the methods which it will follow in attaining those objectives, are as follows:

1. To encourage advance planning of public construction jobs, in order to provide employment while private industry is reconverting to the production of peacetime products;
2. To concentrate the united efforts of every branch of the construction industry and all other parties interested in public construction in that undertaking;
3. To assume the responsibility of arousing public interest in every community in Missouri in the necessity of carrying out now every preliminary step, so that contracts can be awarded and men actually put to work on very short notice in every locality where public-works construction is necessary to meet the unemployment problem;
4. To arrange for the appointment of community committees, representing

every business, professional and public interest in every community in the state to study (a) the needs of the community for worth-while public works, (b) the financial problems involved in supplying the funds for the preparation of surveys and plans and for the purchase of sites and rights-of-way, and for paying for actual construction, (c) to recommend to the regularly constituted legal authorities steps for undertaking those projects in the order of their importance, and (d) furnish the necessary public support to carry out those projects;

5. To urge that only projects which will be useful be undertaken, and that each community plan to raise the funds itself for financing such projects, because financing by the Federal government is contrary to the American way of living and working;

6. To undertake a comprehensive study of the legal phases of such a post-war program and to advocate and work for any necessary changes in state or local laws as required to make such a program possible;

7. To endeavor, through the work of local citizens councils, to secure from each community information about its problems, needs and financial situation, and to compile this information into a comprehensive inventory available to the public, public officials and legislators.

E. C. L. Wagner, Manager of the A. G. C. of Missouri, and Secretary-Treasurer of the Council, states, "This movement is in no sense an attempt to drum up a lot of business for persons and firms connected with the construction industry. It is an honest attempt to build up the resources of our local communities and to add to their wealth and prosperity."

The Constructors Association of Western Pennsylvania, also affiliated with the A. G. C., has set up a Pre-Planning Committee which has already gone into action in an endeavor to have rights-of-way secured, surveys made, and plans and specifications developed now for such work as can be put under construction immediately at the close of the war. This committee has already interviewed a number of public officials in the cities, counties, boroughs and townships of the state, with suggestions for immediate preparations for post-war work. As part of its program, the Committee has prepared a pamphlet setting forth its post-war construction program, thousands of which have already been dis-

tributed. Many letters endorsing the program and asking for more pamphlets for distribution were received, showing that the public too is thinking about post-war problems and welcomes suggestions and guidance for taking practical action.

In addition, the Pennsylvania Constructors have initiated a series of radio talks, the purpose of which is to encourage the public to show an interest in the program and back up public officials in their post-war planning. Roy A. MacGregor, Executive Secretary of the Association, is also Chairman of the Secretaries and Managers Committee of the Associated General Contractors of America which is working on a national program to stimulate practical planning for post-war construction.

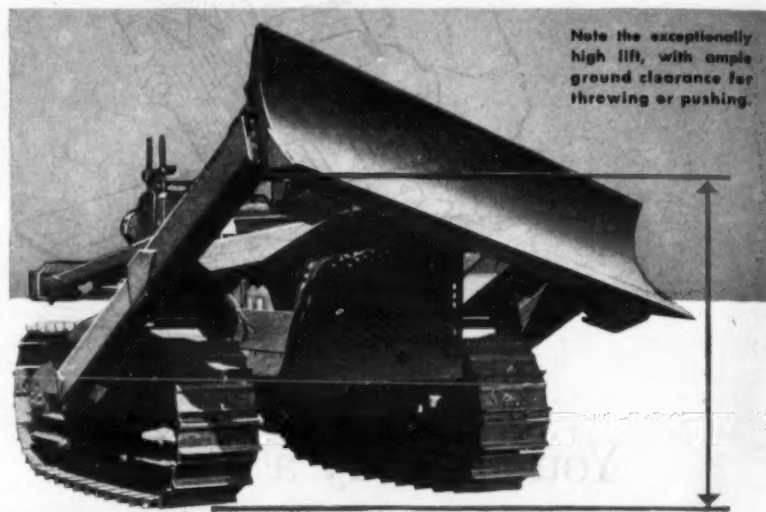
The Southern California Chapter of the A. G. C. of A., set up as its first post-war planning objective a program for the state, which was presented to the spring session of the State Legislature. This resulted in the appropriation or authorization of nearly \$150,-

000,000 for post-war construction of state projects. In addition a State Reconstruction and Reemployment Commission was created, with C. H. Purcell, State Director of Public Works, designated in the law as Chairman.

The second phase of this chapter's program is with the counties, cities, and other political subdivisions, to encourage them to set up a plan similar to that of the state. Following this, F. J. Connolly, Chapter Manager, reports a plan for a series of conferences with the leading executives of the principal industrial groups in Southern California, to urge them to engage architects, engineers and contractors for consultation immediately upon the post-war conversion of their industries and plants, and to make their own plans for recapturing their regular markets as promptly as possible after the war.

Taylor G. Soper, Executive Secretary of the Illinois Road Builders Association, reports that this group has a two-fold program to promote post-war high-

(Continued on next page)



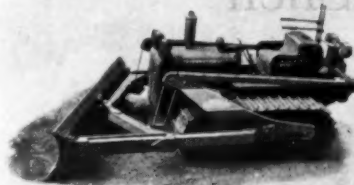
Note the exceptionally high lift, with ample ground clearance for throwing or pushing.

For Positive Action ✓ Smooth Performance ✓ Minimum Maintenance ✓ Full Visibility ✓ Efficient Teamwork.

The Heil Co. announces new

## Cable Dozers

for International Harvester TracTracTors



### HEIL CABLE DOZER WITH TRAILBUILDER BLADE

Heil Power Control Unit gives Cable Dozers quick, positive, smooth cable control — with little effort. Simple, dependable, troublefree. Levers adjustable to suit operator's reach.

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

Designed to work together—through cooperation of the International Harvester and Heil Co. engineering departments — the International Harvester TracTracTor and this new Heil Cable Dozer provide a perfectly balanced team.

The Cable Dozer "looks right" on the tractor — and it does not distort or unbalance the operation of the tractor one bit more than its compact, trim, modern appearance suggests. Simplified mounting avoids obstructing operator's view — gives him full, free vision ahead. The machine "feels right" — performs smoothly, gives fast, positive action under the toughest conditions.

Trailbuilder Blade and "A" frame are interchangeable with the Bulldozer blade and frame. Rugged construction assures long, trouble-free life . . . Ask your International TracTracTor Distributor for further details.

Write for free bulletin R-14



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because it's 60% thicker up the Center than at the Sides

2. Resists Wear as Well as Breakage



The thicker center extends to the cutting edge where it retards wear-back.

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Thicker socket allows deep bend; load is centered.

1. You Get the Strength of a 13 Gauge Shovel with Only 15 Gauge Average Weight.



THE UNION FORK & HOE COMPANY  
662 Hocking Street, Columbus 15, Ohio

RAZOR-BACK SHOVELS  
(THE ORIGINAL TUBULAR SHANK TYPE)

Also Stone, Ballast, Industrial Forks, Asphalt and Road Rakes. Distributors Everywhere.



# "Telling the Public", Contractors' Program

(Continued from preceding page)

way and airport construction in the state of Illinois. One phase of this is education of the public to the need for a planned highway program after the war, and the other a continuation of the Association's efforts to keep gas tax funds for highway purposes.

As soon as it is deemed feasible, this Road Builders Association will sponsor a caravan throughout the state, to be composed of officials of the Association and, if possible, state highway officials. The plan is to have this caravan visit every community of the state to discuss road problems with civic officials, chambers of commerce, congressmen, newspaper editors, and other civic leaders, and to show that road construction can be a valuable instrument in "winning the peace".

The New York State Chapter of the A. G. C. has been working very closely with the New York State Public Works Post-War Planning Commission since it was authorized by law in May, 1942. Henry L. Deming, Managing Director of the Chapter, reports, "We are rather proud of the results obtained to date, in that we now have a large number of definite projects which are ready to go into construction as soon as conditions permit. During this period our contractor members have rendered invaluable assistance in obtaining information pertaining to projects in their home area, necessary in compiling highway and bridge jobs. They have made studies and investigations relative to social and economic conditions; assisted in every way possible on local projects within their home counties; and helped plan, with their own municipal planning boards, projects that are essential after the war. They have been and are continuing work with labor groups in establishing complete understandings, thereby avoiding tie-ups when the jobs are under way."

This Chapter has also taken on the job of compiling a complete record of the job of compiling a complete record of man-hours and necessary materials required on each project for which the state has completed plans and specifications. This data will be available to every contractor member and to the State Public Works Department, and will assist materially in allocating jobs

to provide needed employment, as well as help the contractor in figuring bids.

In programming long-range projects for future development and expansion, Mr. Deming points out that the New York State Chapter has by no means lost sight of the importance of airfields. A study is being made of municipal airports, and a program of expansion and suggested new construction being drawn up.

## Telling the Public

A splendid job of public relations and education has been done by the Associated General Contractors of Minnesota in the preparation and distribution of a booklet entitled "Post-war Construction and the Taxpayer" (C.&E.M., Oct., 1943, page 4). Designed for the average citizen, this booklet tells the story of the construction industry's contribution to the war effort, and indicates how it can make a similar vital contribution to peace and prosperity in the future, providing plans are made now.

Many of the other contractor groups are doing excellent educational jobs in telling the public the facts about the place of construction in our post-war economy; there are too many to discuss them all. In addition, a number of individual contractors have instituted interesting and informative advertising and public-relations campaigns which show foresight, planning, and real leadership—a leadership in thinking and broad outlook which is considerably ahead of our political officials. For example, the Austin Co., of Cleveland, Ohio, well-known engineers and builders, recently ran a two-page advertisement in a national magazine which was entitled "The Vision to Build a New World". The text stated "The world is waiting for constructive leadership . . . waiting with resources, manpower and markets . . . waiting and hoping not for exploitation, but for cooperation," and then went on "We have already shaped our plans to help companies or governments translate these opportunities into realities".

The Koss Construction Co., Des Moines, Iowa, recently launched a newspaper advertising campaign in a number of midwestern cities, pointing out to the public, by means of striking headlines and actual construction pictures, the excellent job private contractors have done since Pearl Harbor. Back of the campaign is the desire to impress upon the public the fact that such tremendous construction would not have been possible without the resources in

men, money, machinery, and engineering experience of America's contractors.

Commenting on this campaign, George C. Koss, Executive Vice President of the company, said, "We are publishing this series of advertisements because we know that the industry can do just as good a job in peacetime as it is now doing in the war program. For many reasons the construction industry was ignored and practically obliterated during the last depression and immediately prior to our entering the war."

"In our opinion, it is up to industry to learn the reasons for our previous failure and take progressive action to prevent a reoccurrence of that situation. Primarily we are interested in maintaining the 'good will' of the public and we believe the advertisements are a step in that direction."

That is one form of post-war planning by contractors. In the August, 1941, issue of CONTRACTORS AND ENGINEERS MONTHLY, we published an article "Selling the Public the Contract System" which stressed the importance

of telling the general taxpaying public why construction by contract is the most efficient and economical way to carry out a public-works construction program. An intelligent public-relations program by the construction industry can contribute right now to its future prosperity and a continuation of the American free-enterprise system.

## Individual Planning

Aside from group action for the preparation of plans for post-war construction, individual contracting firms are faced with the problem of keeping their organizations intact and of making their own plans for future construction activity. Many road contractors are staying in business by taking on highway maintenance contracts, a type of work in which there was little interest by contractors in the past, but which today provides not only a means of tiding over this period of inactivity but also an opportunity of making a definite contribution to the maintenance of our

(Concluded on page 66)



## Heil Hydraulic Bulldozer —tailormade to Cletrac Tractor

... gives you full visibility, perfect balance,  
the rugged strength suggested by its  
clean, modern appearance

## Sensitive Heil Hydraulic System gives fast, accurate control over blade

You have to see this popular Heil unit in action to appreciate its speed and flexibility — its ability to stand up and come through dependably where the going is tough. Sound engineering design, reduced to the utmost simplicity, guarantees few service interruptions and cuts maintenance costs.

Trailbuilder blade readily angled to right or left for side-casting in new cuts. Bulldozer blade

takes rocks and stumps without waver.

The hydraulic control is positive and accurate in all positions — makes this the ideal machine for clean-looking jobs of finishing or landscaping that you can be proud of.

For full loads and more yardage per day and per year — at lower cost — use Heil Earth-moving Equipment.

Write for bulletins.

## FOR CLETRAC TRACTORS, MODELS A, B, D, F

Trailbuilder blade and "A" frame are interchangeable with the bulldozer blade. Low hydraulic pressure is possible because of the large diameter hydraulic cylinders. R-15



SEE YOUR CLETRAC TRACTOR DEALER



THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

## A big mouthful with every bite

In dirt, clay, coal, gravel or ore you can rely on one of the tough, properly designed, Brownhoist buckets to take a full load with every bite. Extra large sheaves reduce rope wear to a minimum. Brownhoist Buckets are available in rope-reeve, power-wheel and link type. For prices and further facts write INDUSTRIAL BROWNHOIST CORPORATION, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

BROWNHOIST BUCKETS  
GIVE MORE YEARS OF  
TROUBLE-FREE PERFORMANCE





# Asphalt Resurfacing With Slag In South

## Georgia Has Large Program Of Contract Maintenance To Speed Salvage of Road Surfaces Over Wide Area

† IN order to reduce further damage to a large mileage of state highways in Georgia this coming winter, contracts were awarded during 1943 for the resurfacing of 400 miles of state highway with asphalt and slag or stone, in addition to 187 miles resurfaced by state forces. By using contractors' as well as state maintenance forces, it was possible to spread the work farther and get a much larger mileage resurfaced in a shorter period and thus insure the salvage of these heavily traveled highways. Three lettings for maintenance work on July 30 and August 6 and 27 involved contracts for 9.9 miles of hot plant-mix bituminous resurfacing at a cost of \$94,886.05, and a total of 400.3 miles of single surface-treatment seal at a cost of \$672,157.06. The plant-mix reseals involve the patching of the present surface and placing approximately 150 pounds of plant-mix material per square yard. The resealing with surface treatment by state forces consists of 187.66 miles at an estimated cost of \$257,534.05 and is similar to the work being done under contract described in this article. In addition, the State Highway Department of Georgia is planning to let contracts for widening and resurfacing with bituminous plant-mix material approximately 23 miles of old worn-out concrete pavement on one of the state's important military highways, at an estimated cost of \$650,000.00.

Typical of the contracts is SAP-MAINT. 985(2) and SAP-MAINT. 115-(3) in Cobb County for resurfacing 6 miles on the Atlanta-Marietta State Route 3 beginning at Bolton Bridge over the Chattahoochee River and extending 6 miles north toward Marietta, and 8 miles on the Marietta-Cartersville road beginning 2 miles north of Marietta and extending 8 miles north toward Cartersville. This work was awarded July 30, 1943, for completion by October 1, 1943, to W. L. Cobb, Inc., of Decatur, Ga., on the bid of \$23,362.91 for the resurfacing, with designated patching to be done by the contractor on force account.

The first section of this contract is also U. S. 27, a major route varying in width from 18 to 20 feet. There were a large number of patches to be made as indicated by the Resident Engineer. For this

work the contractor maintained a crew with a flat-bed truck carrying the slag and towing a 2-wheel Littleford heating kettle equipped with a hand pump for spraying the patches before and after placing the slag. These patches were brought up flush with the surface of the existing pavement and showed uniformity and good riding qualities even before the resurfacing was completed.

### The Resurfacing

The patched pavement was cleaned of any foreign material and then shot the full width of 18 or 20 feet with 0.3 gallon of asphalt per square yard, using the contractor's 1,250-gallon Kinney pressure distributor mounted on a Mack truck. All traffic was held up during this operation and until the spreader trucks



C. & E. M. Photo

A Georgia road being resurfaced, showing the application of No. 5 slag almost complete over the shot of asphalt.

had completed covering at least one side of the road with the No. 5 slag. This slag, from Birmingham, Ala., has a screen size averaging  $\frac{1}{2}$  inch with 95 to 100 per cent passing a  $\frac{3}{4}$ -inch screen. It was delivered in bottom-dump cars and unloaded by a Burch belt conveyor. Three men were required to unload the cars. The Pan American 50 to 150-pene-

tration asphalt was delivered in 10,000-gallon tank cars and heated for unloading by a Cleaver-Brooks tank-car heater.

The eight  $1\frac{1}{2}$ -ton Dodge trucks hauling the slag were all equipped with St. Paul hydraulic hoists and bodies for dumping and with spreaders for dropping an even layer of the slag over the

(Concluded on page 37)

**WORKING for  
VICTORY**  
LIMA CRANES HAVE WHAT IT  
TAKES TO SPEED UP WAR WORK  
6 REASONS WHY -

- 1 INDEPENDENT CLUTCHES**—LIMA cranes can travel and raise or lower the boom at the same time, or swing, hoist and travel at the same time, or do all four operations simultaneously. Imagine the saving in time and the convenience of such a feature.
- 2 LARGE DIAMETER DRUMS**—Drums are of extra large diameter and are of sufficient width to carry the maximum amount of cable for ordinary length booms. Big drums afford longer cable life.
- 3 ANTI-FRICTION BEARINGS**—To further increase the efficiency of LIMA cranes, all important bearing points, including the drums are equipped with anti-friction bearings.
- 4 HELICAL CUT GEARS**—Helical gears are used throughout the main machinery. This LIMA feature assures quiet operation and long life.
- 5 FAST, LIVE BOOM HOIST**—The boom hoist is so designed that absolute safety is assured when raising or lowering the boom. It is independent of all other motions.
- 6 EASE OF OPERATION**—The clutches and brakes are designed for smooth, easy operation. The clutches are the inside expanding type. The bands are extra wide with the maximum of clutch area, thus affording longer life to the lining and freedom from constant adjustment.

Send for free descriptive bulletins

LIMA LIFTING CRANE HELPING TO SPEED UP THE HANDLING OF VITAL WAR SUPPLIES DESTINED FOR SOME FOREIGN BATTLE FRONT.



Buy War Bonds and Stamps

**LIMA LOCOMOTIVE WORKS,  
INCORPORATED**  
SHOVEL AND CRANE DIVISION  
LIMA, OHIO U. S. A.

NEW YORK, N. Y. PHILADELPHIA, PA. MEMPHIS, TENN.  
NEWARK, N. J. PORTLAND, ORE. DALLAS, TEXAS  
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VANCOUVER, B. C. MONTREAL, QUEBEC, CANADA

**ASPHALT  
★ MIXING  
PLANTS**

PORTABLE  
and  
STATIONARY



★ Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, incorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. Write for Bulletin CE-260.

HETHERINGTON & BERNER INC.  
Indianapolis, Indiana

Hetherington  
& Berner



SHOVELS  $\frac{1}{4}$  YD. TO  $3\frac{1}{2}$  YDS.

DRAGLINES - VARIABLE

CRANES 13 TONS TO 65 TONS

**CRANES  
SHOVELS  
DRAGLINES**



### Literature on Clutches For Highway Equipment

The Rockford line of industrial clutches and power take-offs for controlling heavy-duty drives from internal-combustion engines is described and illustrated in a group of folders, copies of which may be secured by those interested direct from the Rockford Drilling Machine Division, Borg-Warner Corp., 1307 Eighteenth Ave., Rockford, Ill.

Typical applications of these units include tractors, graders, compressors, pavers, mixers, shovels, cranes, road

rollers, distributors, and similar construction equipment. Rugged, compact, and accurately built, the Rockford line includes over-center and spring-loaded clutches, Pullmore multiple-disc clutches, and power take-offs. The over-center models lock in or out of engagement until the operator changes the position of the control lever or pedal, while Rockford spring-loaded clutches operate like an automobile clutch, with spring pressure holding the plates in driving contact continuously except when disengaged by counter pressure on the control lever or pedal.

### New Wrench Catalog For Wartime Buyers

A new wrench catalog, entitled "Fight-in' Tools for Every Job" and designed for busy wartime buyers, has just been issued by the Blackhawk Mfg. Co., Milwaukee 1, Wis. Recognizing many of the emergency conditions now existing, the catalog was prepared to be of assistance beyond the mere listing of items. A "Dictionary of Popular Wrench Terms" is included to aid new personnel, and another section illustrates how proper selection of wrenches adds speed, safety

and utility to the job.

By omitting such wrenches as are "suspended for the duration", the booklet aims to eliminate delays caused by orders for items no longer available, and an accompanying price schedule carries a complete table of suggested substitutions. In spite of Government restrictions and the necessary curtailment of some items, a complete basic range in socket, box-type and open-end wrenches is described.

Copies of this catalog, No. 243, may be secured by those interested direct from the manufacturer.

# THE "Fighting Four"

## INSPECT LUBRICATE ADJUST REPLACE

Look your equipment over frequently. For expert "internal" inspection of operating parts or functions, call in a trained "Caterpillar" service man. READ YOUR OPERATOR'S INSTRUCTION BOOK.

Use the right oil at the right time in the right place and in the right quantity. Keep the oil clean—change before it becomes dirty and deteriorated. FOLLOW THE OPERATOR'S INSTRUCTION BOOK.

Tighten all bolts. Keep fan belt and tracks at proper tension. READ THE OPERATOR'S INSTRUCTION BOOK. For fuel injection valves and other precision adjustments, let your experienced service-dealer do the work. He'll do it well.

Have your service-dealer replace or repair worn bearings, track rollers, pins and bushings, sprockets, cylinder liners, clutch linings. His service helps restore power and extend equipment life. Saves critical materials, too.

**H**ERE are the four things which are essential in keeping your "Caterpillar" Diesel Tractors in vigorous fighting trim: Inspection—Lubrication—Adjustment—Replacement. Call them to duty ahead of trouble . . . and until the day when you can again get all the new "Caterpillar" Diesels you want, they'll add days, weeks, months of valuable service life to your present units. There's scarcely a "Caterpillar" Diesel Tractor, Motor Grader, Engine or Electric Set—regardless of age or usage—that hasn't a lot of dependable working hours left in it.

## CATERPILLAR DIESEL



CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!





## Manufacturers Face Post-War Problems

(Continued from page 2)

Council in New York City, pointed out that these problems of readjustment should be no more difficult than our recent adjustment to wartime conditions. Mr. Clark said:

"The people of a war-torn world, especially of the United States, are not going to give in to such depression as we could visualize. They are fighting for freedom, security and the good things of life, and they are going to have them. To the extent that industry is far-seeing, courageous and able, there should be a return to free enterprise. No business man who has had to spend time in Washington and to suffer with reports, statistics and red tape, which are necessarily involved in the planned control of the vast public effort occasioned by this war, can help being aghast at the cost of such control. He hopes and prays for a quick change to an order in which a light hand coordinates what is planned and carried out by private industry.

"But let us not expect it too quickly—it will have to be gradual. In the first place, government will be involved in the policing of the world and in a public-works program that may be used to cushion the return to private industry of the war workers and the armed forces. There will be a vast job in the clearing up of commitments for war goods and the handling of work in progress. To the extent that private industry takes a courageous and forward-looking part and hastens its transition, the shift to private control and initiative will be hastened."

Frederick C. Crawford, President of the National Manufacturers Association, said in a speech recently, "Our rehabilitation program is not one alone of sheer efficiency or sheer inventive genius. A whole world will have to be rebuilt. Our own industries will have to be reconverted. Industries in the war-torn countries will have to be rebuilt. The job

will require the investment of astronomical sums of capital. Whether we can do it or not, whether we shall have real prosperity or a real depression in the post-war world, depends in a great measure on whether venture capital can be encouraged to come out of hiding.

"Government cannot supply this missing capital. It has no capital of its own. Its only resources are the taxable incomes of its citizens, and the income of the private citizen depends upon the productivity of private enterprise."

### Manufacturers' Problems

What are some of the problems facing the manufacturers in the construction-equipment industry, and all other manufacturers as well? In the first place, of course, there is the problem of uncertainty—not of the final outcome of the war for we know it will be victory, but of how and when that victory will come, how much the cost will be, how long wartime restrictions on production and construction for civilian needs will continue building up a backlog of demand for

these products as soon as they are available, and what this country's attitude will be toward an international cooperative effort for the maintenance of peace and the establishment of world economic stability and trade.

Already manufacturers are faced with the problem of cancelled government contracts and of what to do with the materials, semi-finished and completed products on hand when the government finds it needs no more of them. This problem will grow in intensity, though it is the consensus that this shift from production for war will probably not occur overnight, but will be gradual as certain phases of preparation by the military are completed, and as war may end in some parts of the world before it ends in others. This very fact, however, makes it imperative that industry have its plans ready to solve its own particular problems when the transition applies directly to it.

Just how the settlement of these war production contracts will be handled is a matter of the utmost importance, not

## YOUR BLOOD CAN SAVE HIM

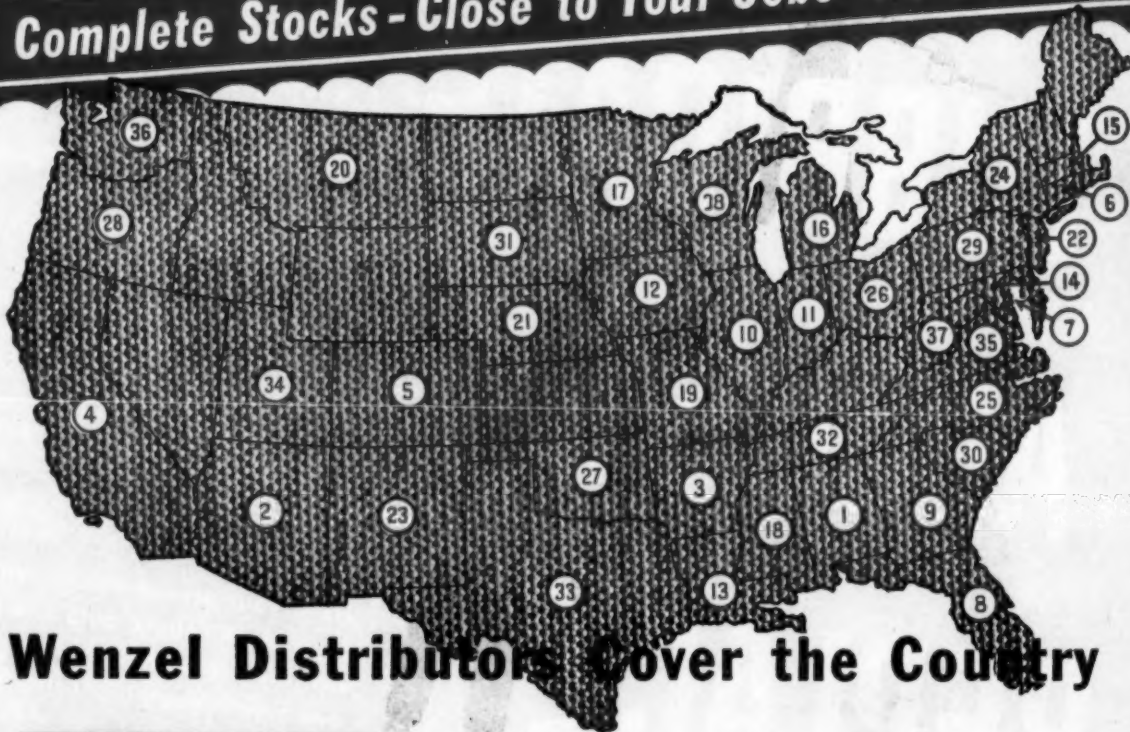


only to the government and the manufacturer concerned, but to the country at large. In order to free their capital and be in a position to reconvert to civilian

(Continued on next page)

# TARPAULINS

Complete Stocks - Close to Your Jobs - No Priority



## Wenzel Distributors Cover the Country

### Why Para Outsell Any Other Brand in America

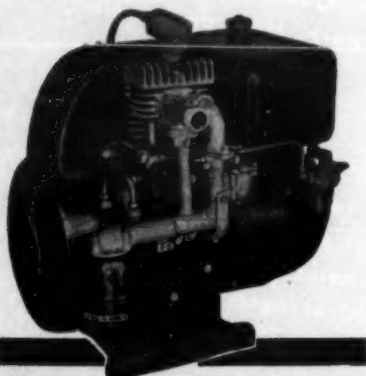
PARA Tarpaulins have strictly a paraffin base which contains no oil or clay. They have been air dried—not exposed to excessive heat. The result is that PARA Tarpaulins are dependably waterproof, have extra strength and long life, are not subject to spontaneous combustion. For paramount quality always specify "PARA"—America's most popular tarpaulin.

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Your inquiry regarding present or past war needs will receive prompt attention. D. W. ONAN & SONS, 1235 Royalston Ave., Minneapolis, Minn.

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## New Guide to Lubrication Of Construction Equipment

The new "Lubrication and Maintenance Guide for Contractors' Equipment" just issued by the Gulf Oil Corp. is dedicated to "the American Contractor who, to a high degree, exemplifies the versatility, skill and venturesome spirit that has made this the powerful nation it is." Today, however, the construction and highway industry is faced with another challenge, that of keeping its present equipment in working order so that it can carry on without breakdowns or delays.

One of the most important factors in keeping equipment on the job is proper and regular lubrication. To aid contractors and highway engineers in this task, the Gulf Oil Corp. has prepared this new booklet which is the result of that company's cumulative experience gained at first hand on construction jobs of all types. Covering the care and lubrication of engines and their parts and accessories, of power transmission assemblies,

wire rope, hydraulic systems, bearings, air compressors and pumps, the Guide does not attempt to give recommendations for specific makes, but rather has presented its suggestions in such a fashion that they will serve as a guide for any similar piece of equipment. Other important subjects, such as cold-weather operating hints, storing equipment, care of tires, storage and handling of petroleum products, and lubricant-dispensing equipment are also discussed.

Copies of this very helpful booklet may be secured by those interested direct from Gulf Oil Corp., 3800 Gulf Bldg., Pittsburgh, Pa., or from this magazine.

## Personnel Change

Announcement has been made of the retirement of Edmund D. Barry, Manager of Industrial Relations at the Universal Atlas Cement Co., New York City, after forty years of service with the company. Mr. Barry will be succeeded by Gordon C. Huth, formerly Assistant Manager.

## Post-War Problems Studied by Industry

(Continued from preceding page)

production, the manufacturers must be able to realize upon their claims against the government. It is therefore important that the machinery for promptly settling these claims be established and in working order now, to avoid long delays and a period of stagnation when the manufacturer is unable to make the necessary expenditures for conversion to peacetime production and to maintain even a normal payroll.

A partial solution to the financing problem might be found in an immediate provision in the Federal tax laws for the establishment of post-war conversion reserves, limited to use within a short period after the termination of war contracts, which would enable manufacturers to keep intact at least their normal peacetime organization and finance the necessary retooling, replacement of old equipment, and other conversion measures to get back on a peacetime production basis. Concerns with great financial strength or ready access to credit will be able to meet the conversion problems, but there are many small businesses, never before able to build up financial reserves, which could do so now, if they did not have to turn it all over to the government, either in taxes or through the renegotiation of war contracts. The proverbial provision for a "rainy day" has always been sound, and it would seem a foresighted policy on the part of our law makers to make such provision possible for the threatening days ahead.

Another of industry's problems, which is a concern of the entire country, is the possibility of the creation of greater and greater monopolies as a result of the war. While the Government has talked much about the protection of the small business, there has been little done about it. The reason is understandable. The large manufacturer has been more able financially and administratively to make the change from peacetime to wartime production and it is much easier and more economical for the government to deal with the large industry than with a host of smaller business units. On the other hand, when peace comes, these large industries will be in a position to carry on when the smaller manufacturers have been squeezed to the wall by the exigencies of war production or conversion to peacetime production.

It is to the stimulus of free competition that America owes its strength today and by it has built up the economies of mass production. It is to the smaller industries that the larger ones have turned in the past for the production of many of their parts, although many companies have gradually absorbed these smaller industries and made the little manufacturer a division of the large company. It is up to industry to exercise the greatest diligence after the war to be sure that American business continues to be able to develop in free competition and does not become a small group of monopolistic industrial empires.

In discussing manufacturers' problems, E. R. Galvin, Sales Manager of R. G. LeTourneau, Inc., and President of the Manufacturers Division, American Road Builders' Association, stated in a letter to CONTRACTORS AND ENGINEERS MONTHLY:

"Before attempting to discuss the question of reconversion by highway-equipment manufacturers from war to peacetime production, we must analyze what the war has done to such manufacturers. There are in general three groups: manufacturers who are supplying for war purposes standard commercial products but in greatly enlarged quantities over any pre-war or anticipated post-war demand; the manufac-

turers who are producing for war purposes normal quantities of standard commercial products and in addition have expanded production facilities to make war goods of a type entirely unrelated to their commercial lines, or war goods which have no post-war commercial sales potential; and manufacturers who may have entirely converted from commercial lines to the production of war goods and who plan on resuming the manufacture of commercial lines after the war."

Mr. Galvin goes on to say, "Our highway and railroad transportation will be woefully run down and dilapidated. Future prosperity is inseparably linked with transportation facilities of wider scope and greater efficiency than ever before. Perhaps one of the greatest contributions that can be made to eliminate post-war unemployment is an extensive five-year highway construction program for counties, towns, states, and the national government. Tied in with this program should be the rehabilitation, modernization, and streamlining of the railroads to permit of high-speed transportation. Coincidentally, air transport facilities must be provided, for a balanced economy requires a balanced transportation program."

A survey of a number of leading manufacturers of construction equipment indicated that the most pressing problem of conversion to peacetime production is that of materials and their control. The majority of the manufacturers in the construction-equipment field have continued the production of their regular line of equipment to varying degrees, regardless of other war production. For this reason reconversion means for them merely securing the materials for civilian production and the market in which to sell it. The release of raw materials and of many of the critical materials such as steel, may be controlled for some time to come. However, partially offsetting this is the fact that presumably they will be released for construction before they are released for other types of production, and wartime necessity has already produced a number of new materials which have proved as good or better than those they are replacing.

When all the problems of conversion, financing, materials and production have been solved, there is still the problem of markets. To continue to employ the greatly increased number of workers in industrial plants, to provide the necessary jobs for the armed forces, and to maintain the national income at the high level deemed essential for national prosperity, it will be necessary to develop new markets. Many manufacturers are already looking to new fields in which their products are applicable but which have never been developed before; others are designing and developing new lines of equipment, to broaden the scope of their activities and decrease their dependence upon the activity of any one field of industry. Still others are looking toward foreign countries as offering the greatest potential new market of the future.

## Manufacturers' Plans

The establishment of the Committee for Economic Development, with Paul G. Hoffman, President of the Studebaker Corp., as its Chairman, was one of the first of industry's concerted moves for a definite program to meet its post-war problems and obligations. The motivation behind this committee is twofold: first, the acceptance of the responsibility which business has to society to provide jobs and markets after the war; and second, the realization that if industry does not do this job for itself, the government will move in and try to do it, with a resultant break-down in the American free-enterprise system and, no doubt, a repetition of the bungling and boondoggling of the depression days.

To minimize the "transition" period

(Continued on page 42)

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J. H. Welch Co., Inc., Buffalo  
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Moriarty Machinery Co., Toledo  
The W. T. Walsh Equipment Co.,  
Cleveland

27-OKLAHOMA  
Leland Equipment Co., Tulsa  
Mideke Supply Co., Oklahoma City  
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May Hardware Co., Portland  
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29-PENNSYLVANIA  
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Strevell-Paterson Hardware Co.,  
Salt Lake City

35-VIRGINIA  
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36-WASHINGTON  
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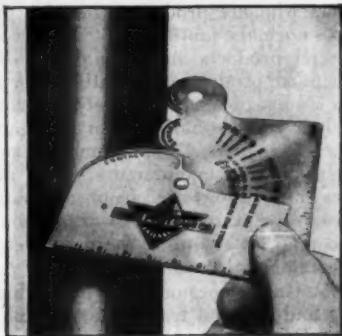
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K COMPANY







A new pocket-size gage for measuring pipe sizes.

### New Three-Point Gage For 1/8 to 12-Inch Pipe

A new pocket-size three-point gage for the instantaneous measurement of all sizes of pipe from 1/8 to 12-inch has been announced by the Three-Point Gage Co., 3821 Broadway, Chicago, Ill. This gage, which is patented in Canada and for which patents are pending in the United States, consists of two pivoted steel plates with edges curved at three points for contact with the pipe to be measured, together with a scale which automatically registers not only the pipe size in terms of the inside diameter but also the drill size for tapping. It is made of steel, with deep etched numerals, and its size when closed is only 2 1/2 x 4 1/4 inches.

The manufacturer states that the gage measures by the simple practical method of determining the outside arc of the pipe at three points of contact, and that, by placing the two fixed contact points of one plate against the outer contour of the pipe and sliding the second or movable plate until it makes the third contact, the marker on the face of the gage will show accurately the size of pipe and the correct drill size for tapping. A feature of the gage is the fact that it is necessary to contact only a small section of the pipe contour and that it will measure pipe in any position, even against a wall or in a corner, and also covered pipe if there is a small opening near a union or other fitting where the gage may be slipped in.

A folder describing and illustrating this pipe gage and giving complete instructions on its use may be secured direct from the manufacturer by referring to this item.

### OPA Amendment 12 On Rented Equipment

A limitation on settlements made between lessors and lessees for the value of construction and road maintenance equipment which has been lost or damaged during a rental period has been established by the Office of Price Administration. Adjustable pricing provisions for sales of operating and maintenance or repair and rebuilding services were also provided and made applicable to rental of equipment on a fully operated basis where a combination rate has been approved and to the rental of dump trucks on a fully operated basis. These new provisions are contained in Amendment 12 to Maximum Price Regulation No. 134 (Construction and Road Maintenance Equipment Rental Prices and Charges for Operating and Maintenance or Repair and Rebuilding Services) and became effective September 30.

The maximum settlement made between a lessor and a lessee for damages occurring to equipment during the rental period is limited by this Amendment to the applicable maximum price established by Maximum Price Regulation 136 (Machines, Parts and Machinery Services) for sale of the equipment or part at the time of the damage. The price of leased equipment when new, or its appraised value at the time of entering into the lease, cannot be used as a basis for settling or negotiating damage

claims, OPA stated.

Application of the new provision means that if the lessor and lessee agree that the equipment was in condition to qualify as "rebuilt and guaranteed" prior to damages, its value may be settled now at 85 per cent of the maximum sales price of equivalent new equipment. If the parties cannot agree as to the operating condition of the equipment at the time of damage, its value ordinarily will be settled on the basis of 55 per cent of the ceiling price of equivalent new equipment. The lessor may always elect to apply the alternative "depreciation method" provided by the machinery regulation to determine value if the damaged equipment is of a class for which a depreciation rate has been listed in the latter regulation.

Without the limitation on the amount of settlement for damages to equipment, OPA stated that these settlements might be an indirect means of evading the price ceilings of the machinery regulation and the rental ceilings of Regulation 134. The limitation does not, of

course, apply to any other claims of damages except those for value of the equipment, nor to settlements made between any of the parties and an insurance company.

The adjustable pricing provisions permit the quoting, contracting or supplying of operating and rebuilding services, or to furnish equipment on a fully operated basis where a combination rate has been approved, or to furnish dump

trucks on a fully operated basis at a price subject to adjustment up to the maximum price in effect at the time such services are performed or such equipment is furnished. It is also provided that a person may supply such services or furnish such equipment at a price to be adjusted upward in accordance with action subsequently taken by OPA where prior authorization by OPA has been obtained.

## MONDIE DROP and UPSET FORGINGS FOR CONSTRUCTION EQUIPMENT

Such as Dipper Teeth, Trencher Teeth, Gear Blanks, Levers, Tie Rods, Cranks, Crank Shafts, Special Shapes, etc. Forging weight range from 1 to 50 pounds.

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**CLEAR A 28 FT. WIDTH IN *One Pass!***

— with the new **WALTER 250 H. P. SNOW FIGHTER**

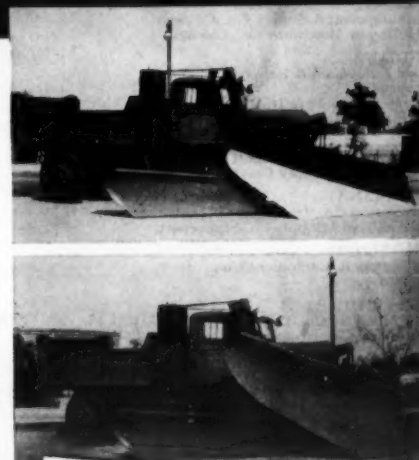
- Latest in a long line of powerful, rugged Snow Fighters, the new Walter 250 h. p. model is a real super snow removal unit—designed to combat the toughest clearing problems highway maintenance crews can meet.

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widening position, thus clearing the roadway completely in **ONE** round trip.

- Like all Walters, the new 250 h. p. Snow Fighter owes its great traction and power to the exclusive engineering of Walter Four-Point Positive Drive. FOUR powerful driving wheels, each receiving full power according to its traction at any instant, keep it driving ahead without slipping, stalling or wheel-spinning, through the heaviest snows and over slippery surfaces. Many other mechanical features contribute to its performance. Write NOW for detailed literature.

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Walter Snow Fighters are available in numerous models to meet varying snow conditions. Model at top is equipped with One-Way Speed Plow and Levelling Wing for general snow removal. Model below has Offset V-Plow and Side Levelling Wing for handling deeper snows. In bad drift conditions, the latter model may be equipped with special Levelling Wing with built-in Rotor that "shoots" snow far to the side. See your Walter distributor for advice on models best suited for your needs—or write us direct.

# WALTER

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**Snow Fighters**



# Highway to Panama Proves Tough Going

## Review of Construction Activities Reveals Delays And Difficulties Faced By Contractors

By EDWIN W. JAMES, Chief, Inter-American Regional Office, Public Roads Administration

WHEN the Japs struck at Pearl Harbor, all Americans in the western hemisphere suddenly realized their geographical unity and solidarity, and at the same time their isolation as a result of the war. Exports to Europe vanished; exports even to the northern half of the hemisphere dwindled because water transport alone had been developed in the past. Steps were taken at once to open a through overland route between the United States and Panama. Funds were made available, surveys of the incomplete sections were started, and plans were made to construct a pioneer road across all the gaps lacking all-weather surfaces. These gaps aggregated 1,060 kilometers (about 668 miles) and occurred in every country south of Guatemala. The surveys required covered more than 790 kilometers.

The pioneer road project was authorized in June, 1942, by two directives from military authorities, one providing for immediate surveys and the other for the construction of a surfaced road on the location of the proposed Inter-American Highway, over all sections which did not at the time have all-weather surfaces. The pioneer road surface was to have a minimum width of 10 feet and a thickness of 8 inches of compacted gravel or crushed stone without artificial binder. A maximum controlling grade was set at 10 per cent, with a tolerance up to 12 per cent for short distances. No maximum curvature was set as it was expected that the construction would follow the alignment standards of the Inter-American Highway. Advantage was to be taken of the fact that where alignment is fixed a variety of profiles can be laid. With the low standards of the pioneer road and the higher standards of the ultimate Inter-American Highway, this process, if carried through, would assure that only a small fraction of the

work on the pioneer road would be discarded in final construction.

An adjustment had to be made also with respect to bridges and culverts. The total number of bridges over 20 feet in length remaining to be built between the southern Mexican frontier and the Panama Canal Zone was 97, and the very large footage of box and pipe culverts needed could be determined only after the completion of the surveys. It was obviously impossible, with the restrictions that affected steel, to fabricate all the needed bridges or provide reinforcement for so large an amount of concrete as would be required for culverts. It was stipulated, therefore, that certain hazardous crossings should, if possible, be completed according to final standards adopted for the Inter-American High-

way and that other bridges should be made temporary structures, of wood, steel, or masonry, built somewhat downstream and off line, if possible. Culverts were treated the same way. Certain ones that could be built exactly in line and at grade of finally anticipated profile could be made permanent; others should be temporary. It was expected that even some log culverts might be built in the temporary class.

### Handling the Work

Construction was to be handled jointly by the Public Roads Administration and the U. S. Engineer Corps and, because of the conditions existing, it was decided to do the entire job so far as possible by contract. The Engineer Corps was responsible for the pioneer road work and the Public Roads Administration for the standard work on roads, bridges and culverts, regardless of whether the drainage structures were on the pioneer or standard sections of the road. In all, nine contracts were let for roads and bridges covering a total of

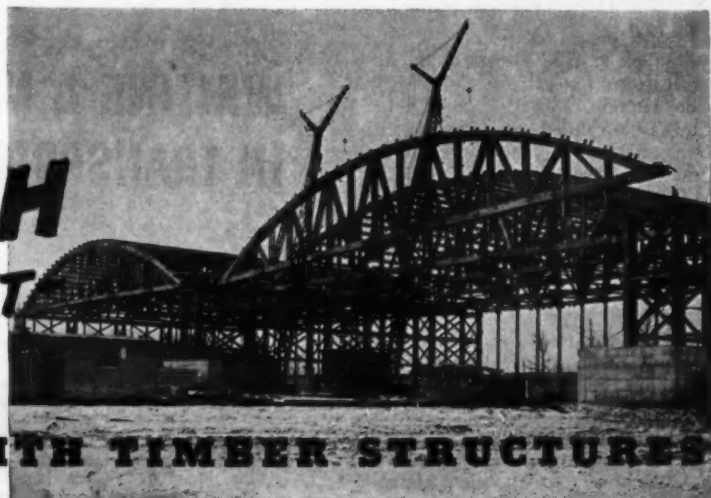


Public Roads Administration Photo  
Corduroy base ready to receive temporary fill on the Inter-American Highway in Costa Rica.

1,405 kilometers of highway and some  
(Continued on page 60)

# STRENGTH IS IMPORTANT

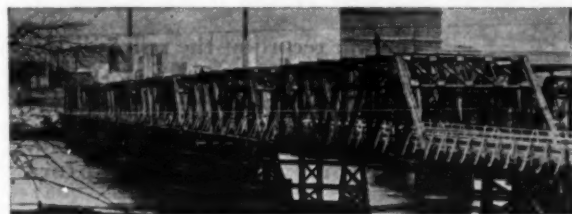
## ... BUILD WITH TIMBER STRUCTURES



CLEVELAND. 200' laminated trusses were designed, prefabricated and erected by Timber Structures, Inc. for 200'x440' assembly plant, for The U.S. Engineers. Front trusses, (supporting doors and roof), were built to carry 450,000 lbs. Intermediate trusses built to carry 310,000 lbs.



PORTLAND. Steel warehouse for Woodbury & Co. The roof of this 200'x300' building is supported by 35-67' trusses, 15 lb. dead load, 40 lb. live load, plus 14,000 lb. concentration at center line of bottom chord and adjacent to each end of the truss. Concentration supports a three-point suspended traveling crane. Architect: Richard Bundeleaf. Contractor: Wegman & Son.



PITTSBURGH. Fleming Park Bridge—756' (six 126' spans) was built for 12-ton trucks and 30-ton street cars. Designed by Allegheny County, Pennsylvania. Detailed, prefabricated by Timber Structures, Inc. Erected by J. P. Casey Co., Inc. and McCrady Construction Co., Aspinwall, Pa. Verne Ketchum, Engineer for Timber Structures, Inc.

ROOF TRUSSES and other items prefabricated by Timber Structures, Inc. embody the natural strength of wood plus connection strength of modern timber connectors. So strong, in fact, are laminated timber members, that they are being used in structures where previously only steel girders were considered practical.

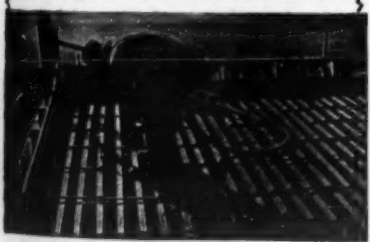
Strength is important, yet it is but one of the features of Timber Structures products. Other advantages are ready source of materials, speed of construction, economy and permanence.

This organization has rendered years of service to contractors, architects, engineers, plant management in prefabricating roof trusses for buildings of all kinds and sizes for every major industry. We invite inquiries as to work performed and as to our ability to serve you in timber or other structural materials. For evidence of work we have done please use the coupon below or write direct for literature.



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## Concrete Patching Saves Illinois Roads

(Continued from page 2)

present program of contract maintenance is one of rehabilitation rather than strictly maintenance, as the patches handled by a maintenance crew are usually from  $\frac{1}{4}$  to  $\frac{1}{2}$  mile apart.

### Spotting the Patches

The Maintenance Department of the District reports to the District Engineer the routes where extensive patching is necessary and the routes are reviewed by the District Engineer. He makes a careful inspection with the District Design, Construction, and Maintenance Engineers and the areas of all patches are marked on the pavement with paint. The indication is placed at the four corners of the patch, with a number used to record the location and size, particularly the length of the patch. The plans for bidding show the number of square yards per mile, divided into the various types of patches.

In the early 1942 contracts the bids were uniform for all sizes of patches. For the later work in 1942 and in 1943 this has been refined, much to the satisfaction of both highway officials and contractors. The patches are divided into four types, each one lane wide: Type 1, an exception to the full-lane width, as it includes only patches to repair corner breaks at joints; Type 2, patches from 2 to 7 feet in length and one lane wide; Type 3, from 7 to 15 feet in length; and Type 4, over 15 feet long.

One advantage of dividing the work into the four types is that the contractors bid lower when the patch is longer, as the area to be paved is larger in proportion to the amount of cutting necessary before patching. In a typical contract for pavement removal and replacement under this system the bid items were:

Type 2	1,940 sq. yds.	\$9.00 per sq. yd.
Type 3	3,204 sq. yds.	7.70 per sq. yd.
Type 4	3,653 sq. yds.	7.15 per sq. yd.
Sub-base replacement gravel	250 cu. yds.	4.10 per cu. yd.

The above prices cover the removal of the old broken concrete pavement, the excavation in connection with the placing of pavement thicker than the existing pavement, and the placing of the concrete patch. Sub-base replacement is bid as a separate item.

Because of the differential in the cost of patches of the different sizes, it is frequently cheaper for the state to extend one patch a few yards into the next because the two patches and the area between will put the patch into the next lower cost bracket.

### Methods Specified

If there is any damage to a shoulder during patching, caused by a shovel operating alongside the pavement, the shoulder must be restored to a condition as good as before the work started. This work is included in the unit price for patching. Where there is unstable sub-base, the contractor is required to remove the subgrade to a depth of 6 inches or more below the proposed subgrade and replace it with gravel or crushed stone. Usually, sub-base replacement is not made except in Type 4 patches.

Changes in specifications from 1942 include permission for the contractor to leave patches open overnight, with suitable barricades and lights, when one lane is left open to traffic. Where suit-



C. & E. M. Photo

Method of marking areas to be patched on Illinois roads. The corners of the patch and its number are painted on the pavement.

able detours are available, the section may be closed to traffic. The latter speeds the work and eliminates a cause of accidents, and when there are plenty of detour roads, there is little inconvenience to traffic. This change in specifications saved 15 cents per square yard over the 1942 bids. This year membrane curing is permitted where formerly paper cure or wet blankets were re-

quired. Where a contractor is operating over a considerable distance, the use of the membrane curing is distinctly advantageous. Quick-setting cement is permitted, or the contractor may use a richer mix of standard cement to insure higher strength at an earlier date to permit opening the patch to traffic.

Permission is granted to use central.  
(Concluded on next page)

## WRITING A NEW CHAPTER IN TRANSPORTATION



A new era of bygone days was represented by the "American Express Train" of 1855, here pictured by the famous lithographer, Nathaniel Currier. In 1869, that era culminated in the completion of the first transcontinental railroad.

Railroads are facing their biggest test in moving today's record volume of freight. GM Diesel freight locomotives are helping the Seaboard to do its part in meeting this emergency.



Reconstruction and new construction are going to need plenty of this hard-hitting, easy-on-fuel power. With normal refinement and development speeded up by war, with production expanded, GM Diesels will be ready to serve in more fields and in more ways than ever.

The war record of the railroads is a remarkable story of transportation.

And potent new factors in writing this story are General Motors Diesel Locomotives.

Tough, tireless freight Diesels are hauling war loads faster, and with rare economy of precious fuel.

They are adding a new chapter to

America's story of railroading, and demonstrating that today's achievements are the first great step in a new era of transportation.

★  
**BACK THE ATTACK—  
WITH WAR BONDS**

## HOISTS

**STEAM • ELECTRIC  
GASOLINE • DIESEL**

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**BELT DRIVEN**

• **FOR OVER 69 YEARS WE  
HAVE BEEN BUILDING FINE  
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• **FOR THE DEFENSE AND  
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KEEP YOUR PRESENT  
HOIST IN GOOD WORKING  
CONDITION**

*We can help you!*

*We proudly fly  
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**LIEBERTHOOD**

MANUFACTURING COMPANY  
Main Office and Works ELIZABETH, NEW JERSEY



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POWER**

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

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ENGINES....15 to 250 H.P....DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.



## Illinois Maintenance Handled by Contract

(Continued from preceding page)

mix plants or truck mixers for the preparation of the patching material. Many contractors do use this method for long hauls. In some instances the general contractor has subbed the pavement breaking to a contractor specializing in that work and subbed the hauling to a truck-mixed concrete contractor, so that he had to do only the excavation, placing of the concrete, finishing, curing, and the reconditioning of the shoulders, which required only a small amount of additional material and some blading.

When pavement is removed, the interior angles at inside corner breaks must not be less than 45 degrees, and the angles of the pavement being removed or the remaining pavement must be not less than 60 degrees for other types of patches. The edges of the patches need not be squared but may follow the line of the cracks, provided the specified angles are not exceeded.

The edges of the patches are hand-trimmed with sledge hammers, but the plane of the cut face must not deviate more than 1½ inches from the vertical. Care is taken that there be no abrupt breaks in the plane of the face that might induce spalling of the pavement. Practically any method of breaking the old pavement except the ball breaker method is permitted as long as the pavement is not shattered or spalled outside the patched area. Jackhammers have been found to give the best results, however.

Special care is taken not to disturb the ½-inch round deformed bars across longitudinal joints or other load-transfer devices. The dowels are always adjusted before the patch is poured. Mechanical tamping of the subgrade is permitted, and low subgrade may be built up with concrete or properly compacted sand, gravel, or crushed stone at the contractor's expense. Wood side forms may be used for patches 10 feet or less in length.

The concrete may be consolidated and finished either by hand or mechanical methods, but a vibrator must be used along the edges of the patch and along both sides of expansion joints. The surface of the concrete is required to be broomed only when the pavement remaining in place has a broom finish. The pavement may not be opened to traffic in less than 3 days, or longer if in the opinion of the engineer weather conditions require the longer period.

### Recapping with Concrete

Where the subgrade is poor and there has been "pumping" of the subgrade by traffic so that recapping with concrete is more economical than patching, the old pavement is broken into not more than 1 square foot in area and

the blocks left in place. District 10 requires a leveling course of from 1 to 2 inches of well-graded gravel with a maximum 1-inch screen size, compacted by a 3-ton roller. The alternate is laying the new concrete directly on the broken slab. Recapping is paid for on a cubic-yard basis.

Wherever the plans call for recapping, the transitions to the existing pavement at each end are at the rate of 10 feet for each 1 inch of thickness of the recapping. In sags, the length of the transition is determined by the engineer. At the transitions, the existing pavement is removed so that there will be no feathering of the recapping pavement. The shoulders adjacent to a recapped section of pavement are brought up to grade as a part of the contract.

### Work in District 10

District 10 of the Illinois Division of Highways covers all of Cook County, in which Chicago and numerous smaller communities are located. It is 954 square miles in area and has 1,300 miles of

state highway, which includes close to 300 miles within the corporate limits of Chicago which are maintained by the state. In 1942 the contract concrete patching program in this District covered 40.5 miles, of which 34.7 miles were 40-foot pavement. In 1943 the program covers 33.5 miles, of which only 5.0 miles are 40-foot pavement.

### Bituminous Patching

In District 10 there is a large mileage of concrete pavement originally 20 feet wide which was later widened to 40 feet by two outside lanes. Where these highways required resurfacing of the center portion, the entire pavement was resurfaced with a dense-graded bituminous concrete. In 1942 District 10 resurfaced 16 miles of pavement, of which 12.25 miles were 40 feet wide. In 1943, the bituminous program included 25.2 miles of pavement, of which 10 miles are 40-foot, 13.7 miles 20-foot, and 1.5 miles are 27-foot.

Two pavement designs are used, depending upon the width and cross-section

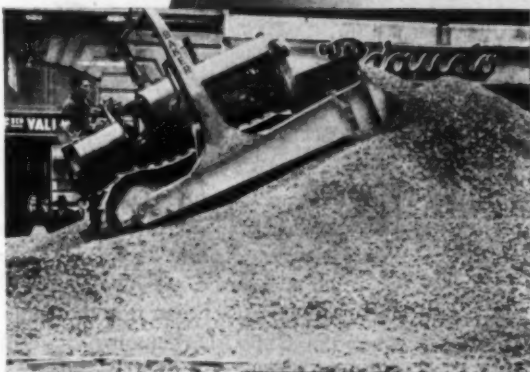
tion of the old concrete. One is a single-course construction of bituminous concrete 2 inches thick, and the other a 1½-inch course and a 1½-inch top course.

### Cleaners for Metal

A new bulletin on the uses of the four available types of cyclodiene-base hydrocarbon solvent degreasers and cleaners for metals is now available from the Colonial Alloys Co. Interesting features are a section dealing with the application of paint or lacquer on the wet surface immediately after the work comes from the cleaner bath, and a description of the protective rust-inhibitive film left on the surface after degreasing in cyclodiene.

Copies of this bulletin, Form No. 11543-1 SUP, may be secured upon written request to Dept. W, Technical Processes Division, Colonial Alloys Co., 2154 E. Somerset St., Philadelphia, Penna., mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Ave. Nueve de Julio  
Buenos Aires  
Arg.



State Street  
Chicago



**Wherever  
there's earth to  
be moved, Baker Hydraulic  
Bulldozers are on the job!**

Chicago gets a new subway and Bakers are put on the job—mucking, ramp grading and spreading material. Buenos Aires, Argentina gets an overpass and Bakers do the earth moving and stock piling with their usual speed. A Baker Gradebuilder gouges a Persian mountain side, turning trail into road, so thousands of tons of Allied supplies can roll into Russia's back door. Dutch Harbor, Alaska gets an unprecedented blizzard and Bakers—that built the air base—are called out to remove snow so patrol planes can land and take off.

The sun never sets on Bakers with their direct hydraulic lift and full down-pressure on the blade. On every continent they're in the thick of it, helping shove the war down the aggressors' throats. When the job is done, Bakers will be a familiar sight once again along highways, on building projects, and in pits.

**THE BAKER MFG. CO.**  
585 Stanford Ave. Springfield, Ill.

### Built Like a Battleship!

You can "pour it on" a Baker—crowd the blade, hog out big loads, doze trees or large boulders, roll logs—they're built to take it. The construction of this front end is typical of the entire unit. Note rugged box type reinforcing for moldboard and push members. High carbon steel renewable side cutters and blade.

**"R-I-B-B-O-N  
J-O-I-N-T"**

Ribbon joint has been a godsend in building roads. Where used liberally for transverse joints, the contraction for each joint is less—thus preventing any appreciable gap in the concrete.

**FLEXIBLE ROAD JOINT  
MACHINE CO.**

WARREN, OHIO, U.S.A.

**BAKER**

The Modern Tractor Equipment Line  
for  
EARTH MOVING  
LEVELING AND GRADE BUILDING  
SNOW REMOVAL  
ROAD MAINTENANCE





### Spreading Chlorides Or Sand on Highways

With the advent of winter, the problem of ice control on highways arises once more. Most highway departments meet this problem by the use of sand, cinders, chlorides, or of mixture thereof, spreading it at hazardous locations. Brokol spreaders made by the Brokol Mfg. Co., Inc., 94 Madison St., Newark, N. J., are designed for this service, as well as for spreading sand, stone and chips on bituminous-treated roads.

The Model 10 Brokol spreader handles stone up to 1½ inches in size, applying it at a width from 6 to 20 feet, regulated by the speed of the truck. The thickness of spread is adjusted by lowering or raising the spreading disk by means of a lever on the operator's platform. The hopper is 96 inches long, 34 inches wide, and extends the full width of any dump body. Two traction wheels keyed to one axle drive the spreader disk through a sturdy set of hardened cut-steel bevel gears. The axle runs in large phosphor-bronze bearings, and the disk shaft in heavy-duty double Timken bearings. Gears and bearings are enclosed in dust-proof and oil-filled housings. A self-locking coupling adjustable to height and length makes attachment of the spreader to the truck easy. Two chains with grab hooks carry the spreader in raised position. The spreader is 33 inches high and works equally well by forward or backward movement of the truck.

The Model 20 spreader is designed especially for spreading sand, cinders, or anti-skid mixtures on icy pavements but works equally well for covering bituminous-treated roads with sand or stone chips. It has a spreading capacity of from 4 to 20 feet which can be regulated by the speed of the truck or by the adjustable deflector plates fastened to the sides of the hopper. It is generally similar in construction to Model 10 and also works equally well by forward or backward movement of the truck.

Copies of Catalog No. N-39-4, describing and illustrating these two models of Brokol spreaders, may be secured by in-

terested contractors and state and county highway engineers direct from the manufacturer by mentioning this item.

### New Trailbuilder Has Number of Features

Among the features of the newly designed Heil Trailbuilder is the power control unit governing the action of the blade. Recently developed by Heil engineers, this unit is said to assure the operator smooth positive action, full visibility, and minimum cable stress.

This Trailbuilder is of rugged construction. Sturdy side arms hold the blade rigidly in position, and the cutting edges are of specially treated alloy steel, removable as well as reversible. Adjustable mushroom grading shoes are available as special equipment and are readily replaceable.

Built to work integrally with International's largest diesel-powered crawler tractor, the Heil unit is easily and conveniently mounted, and so placed that its

center of gravity is as close as possible to the center of gravity of the tractor. The manufacturer states that full tractive effort, with no "nosing down", is accomplished because tractor balance is maintained on the full length of the tracks which bear on the ground at all times.

Tilting the blade is easy and requires no special tools. By removing the combination connecting and locking pin from the front ends of the extension arms, the moldboard may be quickly reset at the desired tilt. Once the pin is set in place, it automatically locks the moldboard in position, without the use of bolts, nuts, or wedges. End tilt adjustments permit the maximum use of the flexibilities of the unit. With the advance corner set low, it gives a plowing action advantageous for starting a sidehill cut and excavating ditches. The Heil positive locking pin with its double-acting design for positive locking and easy removal makes it possible for one man to make all end tilt adjustments.

A choice of two side push-arm pivot points is provided for adjustment to in-

crease or decrease the effective cutting blade penetration. When the going gets tough in hardpan, frozen ground or rock-imbudded earth, the arms may be set in the upper position for maximum digging penetration, while for normal operations the arms are set in the lower position.

Further details on this new Trailbuilder may be secured by those interested direct from the Heil Co., Milwaukee 7, Wis. Just mention this item.

### COMPLETE WELL POINT SYSTEMS WILL DRY UP ANY EXCAVATION

Faster—More Economically

Write for Job Estimate and Literature

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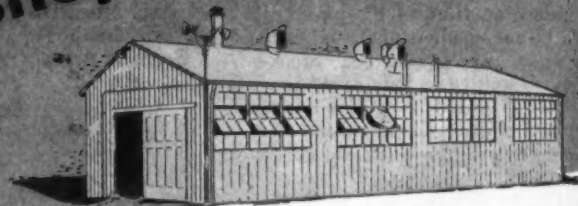
MACHINERY & EQUIPMENT CO., Inc.

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Tel. IRonsides 6-8600

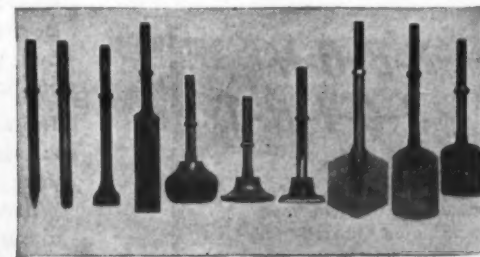
## the little forge shop on the hill...



A YEAR or so ago Cleveland engineers decided that our famous "CLEVALOY" paving breaker chisels and moils could be made practically breakage proof by improved forging and heat treating methods. So the Chief selected a group of heady engineers and mechanics to whom he said in effect: "Get over into that little shop on the hill and stay there until you make 'CLEVALOY' tools practically unbreakable!" Separated from the problems of mass production, this group settled down to a task which then seemed none too easy. Today, you should see inside the little forge shop on the hill. Every square foot of its floor area is efficiently jammed with power hammers, lead pots, automatic conveyors, quenching fixtures, inspecting devices, and what not. And from this maze of machinery there roll forth daily large numbers of "armor-plated" CLEVALOY chisels and moils—the best paving breaker steels operators have ever used.

We have plenty of CLEVALOY paving breaker chisels and moils ready for shipment to purchasers with required priority. First price is a little higher than most—in the long run, they cost less than half. Available in either 1½" x 6" or 1¼" x 6" shanks, and in the standard 14", 18", and 24" lengths. At present, only moils and narrow chisels are available with this new "armor-plated" forging and heat treating—the others will come later. However, all our paving breaker tools illustrated are available in regular steel, and they are equal to any others on the market.

Unretouched, actual-size section through a CLEVALOY shank. Note the hardness penetration and fiber flow lines. CLEVALOY shanks are "armor-plated" against breakage—thousands made by this method, but not one complaint of breakage in the vicinity of the collar.



Moil Harrow Wide Digging Shoring 7" Taper 5" Taper Clay Clay Asphalt Chisel Chisel Blade Driver Bar Bar Blade Spade Cutter

BUY U. S. WAR BONDS AND STAMPS

THE CLEVELAND ROCK DRILL CO.  
Division of The Cleveland Pneumatic Tool Co. Cleveland 5, Ohio  
BRANCH OFFICES IN ALL PRINCIPAL CITIES AND MINING CENTERS

### IMPROVED SPOT WELDER



Speed production and get better, more uniform welds, at lower cost. Contractors have already told us what excellent results they are now getting with this fast-proof equipment.

### LOWER YOUR COSTS!

Cut costs for current. Weld economically with this line of rugged, efficient, simply constructed Model J Spot Welders. Designed for general work, ideal for welding all kinds of sheet metal. Even "green help" produces excellent welds.

SEND FOR FREE CATALOG

giving prices and full details on Model J spot welders and accessories.

Universal Power Corp.

4897 Euclid Avenue Cleveland, Ohio



# Timber Substructure For Sikanni Bridge

(Continued from page 11)

The piers and approach bents was cut at Army Milepost 60 in October. The piles were trucked 56 miles over the road to the bridge site where they were peeled and mop-treated with water-borne salt preservative at the rate of 21 pounds per MBF. About half of the piles arrived on the job early enough in the season to be treated according to the specifications of the company supplying the preservative. After November 1, the temperature dropped to from zero to 20 degrees below, and the piles which arrived after the first of November were frozen and had to be heated before peeling and sheltered during treatment. Tests made in April, 1943, on sections of these treated piles showed an effective penetration of sodium fluoride to a depth of about 3/4 inch.

The piles varied from 40 to 65 feet in length, with a butt diameter of 12 to 20 inches and a tip diameter from 8 inches up. The 4 x 10-inch sheathing for the piers was cut from native spruce by the mills at Army Mile 256 and Army Mile 255. The bracing was of creosote-treated Douglas fir shipped from Oregon.

The first pile was driven for bent 0 on November 19, 1942, after a delay of two weeks during which time the shovel was in use in the construction of the cut for the temporary approach from the south. The eighteen piles in half bent 0 and bents 1, 2 and 3 were 30, 35, 40 and 60 feet in length, respectively. All piles were driven to refusal at an average penetration of 15 feet. There was some difficulty in aligning and holding the piles due to shale rock slabs sloughed off into the slope from the rock cliffs.

The bents for the approach from the north were started on December 12, 1942, and were completed in the order of Nos. 4, 5, and 6. All of these bents required 65-foot piles which were driven by a crane and pile driver located on the bank of the river. The 65-foot piles for bents 7 and 8 were driven from the hill, and were in place on December 19. These piles were driven to refusal at an average penetration of 25 feet below original ground line. At this time, the temperature varied between 20 and 30 degrees below zero, making it necessary to blast the frozen layer of ground before driving was started.

The sixteen 45-foot piles in pier 1 were driven with shoes to refusal at 23 feet. The action of these piles conformed with sounding No. 1 which showed a soft to firm layer of shale at 24 feet. The twenty-five piles for pier No. 2 are 55 feet in length and averaged 25-foot penetration. Tests indicated these piles to be safe for a load of 20 tons or more. Some trouble was encountered in holding the piles in line, possibly due to large boulders which were indicated by boring No. 2 taken at this pier.

Pier No. 3, the other ice-breaker pier of twenty-five piles, was started on December 6 but work was delayed by difficulties. The penetration of the first 17 piles was 30 feet on an average, but the remaining piles on the upstream side

penetrated only about 8 feet. It was therefore decided to excavate to find the obstruction. A 1/2-yard clamshell uncovered and removed a mass of granite boulders ranging in size from 6 to 18 inches in diameter. Pile driving was then resumed and a penetration of 30 feet below original ground level was obtained for all piles, although considerable trouble was experienced in holding the piles in alignment during driving. The sixteen 45-foot piles for pier No. 4 were driven to refusal without difficulty, an average penetration of 26 feet being obtained.

There was some delay in obtaining the treated timber for bracing the piers and bents but the work of aligning and spacing the piles, spiking the sheathing, placing nose armor, and cutting off the piles to grade went on during January and February. At the same time, falsework was erected between the piers to support the truss sections and a temporary pile log runway for the erection crane was built.

During the first two weeks in Feb-

ruary, the temperature averaged 15 degrees below zero. In the last two weeks of the month, a prolonged Chinook wind raised the temperature to 52 degrees above zero. Melting snow produced considerable run-off which raised the water in the Sikanni Chief River. This forced the ice up above the ordinary level, creating a pressure ridge. To relieve the ice pressure and prevent an early break-up around the bridge where construction activities were being carried on, the ice just below the bridge was blasted and a channel opened. This channel was kept open for the rest of the winter.

## Superstructure Construction

All materials for the superstructure were shipped from Oregon to the railroad at Dawson City and then trucked over the new highway to the bridge site, a distance of approximately 164 miles. The first shipment arrived on the job January 17 and by February 28 all material, with the exception of one carload, was stockpiled at the bridge site. How-



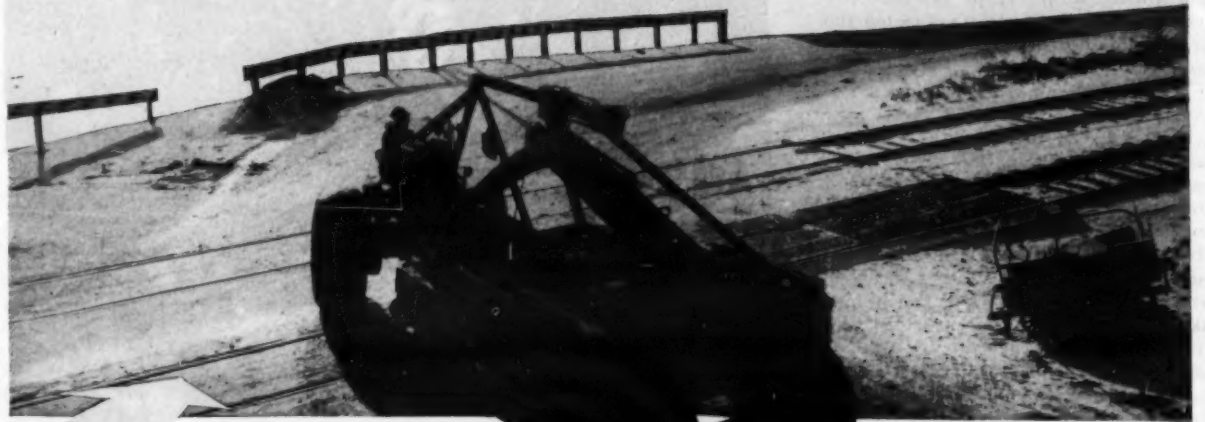
Public Roads Administration Photo

A crane working in the treated-timber stock yard near the north approach to the Sikanni Chief River Bridge on the Alaska Highway.

ever, most of the bearing blocks and grills were in the missing carload and erection could not proceed. The missing timbers arrived on March 16.

(Continued on page 50)

# For Better Winter and Wet Weather OPERATION OF TOURNAPULLS . . .



Tournapull with a load of material to spread over an icy, slippery spot.

## Give Drive Wheels a Grip by Reducing Slippery Spots . . . You'll Save Vital Rubber, Move Bigger Loads Faster

**EXTRA TRACTIVE POWER** is built into Tournapulls by:

1. Centering weight on the drive wheels.
2. Use of extra-large diameter tires.

This extra tractive power enables Tournapulls to haul over soft, slippery spots that stick ordinary equipment. But, to take full advantage of this extra traction, keep your haul roads free from the slippage that's bound to result on icy, muddy surfaces.

**INCREASE TIRE LIFE**—Slippage—whether from wetness, mud or ice—slows travel speed, usually reduces the

load you can haul, wears off rubber and increases the danger of tire cuts. To lengthen tire life and get top speed and top yardage, give Tournapull drive wheels a slip-free surface that puts all your tractive power to work.

**SAND ICY ROADS**—If your haul road is icy, pick up a Tournapull load of sand or cinders and spread it in a thin layer over the icy section.

**AFTER QUICK SHOWERS**—When a quick shower wets the top inch or so of your haul road so it's "slick as glass", get some dry material out of the cut and spread it over the roadway. If the haul is too long to do

this quickly or the wetness goes down 3 or 4 inches, scrape it off with a Tournapull, Dozer or motor grader.

**MUCK OUT SOFT SPOTS**—When slippage occurs in soft spots, muck 'em out with a Tournapull or Dozer. After mucking out, fill in with dry dirt from the cut. Remember the size of your load is determined by what you can haul through and over slippery places. Make it big by cutting out slippage. You'll find it pays.

**DEALER SERVICE PAYS, TOO**—Tournapulls are stoutly constructed to cut lost time to a minimum. The best of equipment, though, requires repair occasionally. Then you'll find quick, expert service available from 183 LeTourneau—"Caterpillar" dealers and branches in the U. S. Use it to keep your equipment operating at top efficiency NOW.



Tournapulls are designed to walk out of troublesome soft spots, but they move bigger loads faster over good winter haul roads like this. Good drainage pays profits.

**R. G. LETOURNEAU INC.**

PEORIA, ILL. — STOCKTON, CALIF.

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**Aeroil** Concrete Heaters  
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**AEROIL BURNER CO., Inc.**  
WEST NEW YORK, NEW JERSEY  
San Francisco, Cal. Dallas, Tex.



# Access-Road Bridge Raised to New Grade

**Fort Dix Road Structure, Built in 1923, Widened in 1929, Is Now Jacked Higher At One End Than at Other**

(Photo on page 1)

† MAKING use of what you have is the order of the day and is especially applicable to the work recently completed on the Fort Dix access road, New Jersey Route 39, near Bordentown. The existing highway was duplicated, with a wide central mall between the two roadways. After the completion of the parallel highway, the grade of the old road was changed, eliminating several hazardous spots.

The change of grade at the Black's Creek crossing necessitated raising the south end of the old 48-foot-span bridge 7 feet 9 inches and the north end 6 feet 6 inches. The best and easiest way to do this would have been with a gang of hydraulic jacks controlled from a central point, or by mechanical jacks, each with its crew making the turns simultaneously. Equipment shortage prevented the use of the former method, and the man-power shortage ruled out the second. The result was a combination which, however, proved effective and at the same time demonstrated the strength of the composite bridge structure.

## Design of Bridge

Black's Creek Bridge with a 30-foot roadway was built in 1923 by the Burlington Freeholders. The structure had three plate girders spaced 12½ feet on centers and 5 feet 2 inches deep, with I-beams carrying the 9-inch reinforced-concrete deck. In 1929, after the New Jersey State Highway Department had taken over the road, the structure was widened 10 feet on each side by splicing the cantilevered floor beams and encasing the splice and extension in concrete. The new end girders were also encased in reinforced concrete, with a knee brace of reinforced concrete. No cross bracing was used for the added sections, although the old bridge was well tied with diagonals of steel angles.

## Preparation for Raising

In preparation for raising the 350-ton structure, 48 and 38-inch lengths of 32-inch I-beams with 12-inch flanges were welded to both ends of the two fasciae and three interior girders, respectively, for use as jacking brackets. To strengthen the riveted stiffener angles at the ends of the girders to withstand the strain during jacking, they were welded along the edges, as the rivets alone would not have carried the load.

At the bottom of each jacking bracket a 12-inch-square x 1-inch-thick plate was welded to a bracket for a bearing plate. Beneath this, 12 x 12-inch timber of varying lengths was suspended by short lengths of angles nailed to the blocks and slid over the bearing block. The hydraulic or mechanical jacks were

set on the abutment at the elevation of the bridge seat, with a section of 12 x 12-inch bearing plate between the jack and the block.

Prior to the jacking a considerable amount of the 1923 abutment concrete, as well as the 1929 encasement concrete, had to be drilled, broken, and removed to permit access to the girders and to provide for the increased width of the higher abutment. This work showed the excellence of the concrete of both jobs and also the protection afforded the steel by the encasement concrete in the 1929 work. The steel was not pitted or corroded, and the bond between the two materials was very strong.

While the net lifts to meet the grade were 7 feet 9 inches and 6 feet 6 inches, the actual lifts were 6 inches higher at each end to permit pouring and finishing the new concrete bridge seat. To prevent the 350-ton mass from sliding toward the north because of the greater rise on the south end, anchors were set in the abutment to tie the structure and prevent longitudinal movement. Also,

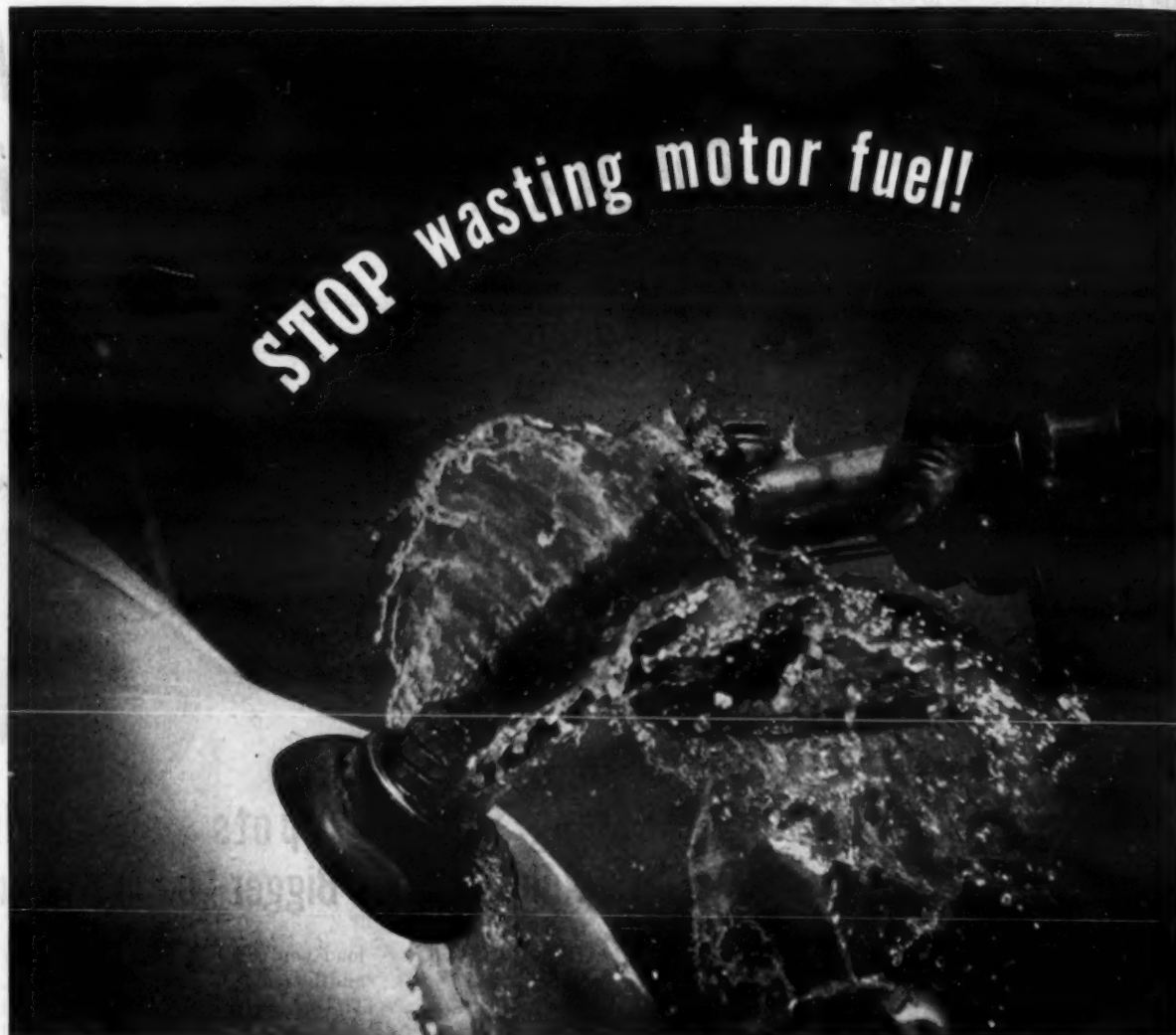
to increase the lateral stability of the structure during the latter part of the jacking, blocks were placed at intervals between the girders and wedged tightly.

## Making the Lift

At the south end, where the greater lift was made, the contractor set 200-ton Watson-Stillman hydraulic jacks under the outside girders, 80-ton mechanical

(Concluded on page 48)

**COMMERCIAL HEAT TREATING  
SEASONING OF STEEL  
CADMIUM, ZINC, TIN and HARD  
CHROME PLATING  
ALL KINDS OF GRINDING  
OPERATIONS  
A Complete Manufacturing Plant  
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ENGINEERING DIVISION  
AGERSTRAND CORPORATION  
Muskegon, Michigan  
Sales Office: 1800 E. Jefferson Ave., Detroit, Mich.**



## RING-FREE Motor Oil saves fuel 2 ways

**RING-FREE REMOVES CARBON.** Carbon on pistons, rings, valves decreases motor efficiency—leads to loss of power—wastes fuel. Macmillan RING-FREE Motor Oil removes carbon while the motor runs! That means better motor lubrication and substantial fuel savings.

**RING-FREE REDUCES FRICTION.** The 2nd thing RING-FREE does to save fuel is reduce motor friction fast! That releases more power to the drive shaft and really cuts fuel waste. Here's proof: In 1094 certified road tests, with various makes of owner driven cars, the

average saving of gasoline was 1.3 miles per gallon after crankcases had been drained and refilled with RING-FREE Motor Oil. In many types of Diesel operations, as much as 25% reductions in operating costs (including fuel and maintenance) are reported. At the same time, oil consumption is reported decreased. Remember saving fuel is important—but beyond that, when it's better motor lubrication that saves fuel it also means a reduction of motor wear.

**MACMILLAN  
RING-FREE  
MOTOR OIL**

**MACMILLAN PETROLEUM CORP.**  
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REDUCES WEAR BY REDUCING FRICTION

# UNION



EST. 1900

**Union Iron Works, Inc.**  
ELIZABETH, New Jersey



## Skelly Named Chairman Of Penna. Post-War Group

James J. Skelly of Media, Penna., President of the Associated Pennsylvania Constructors and of the Highway Contractors' Division of the American Road Builders' Association, has been named Chairman of the Pennsylvania Post-War Highway Committee, according to an announcement by E. R. Snyder, Chairman of the national post-war public relations committee of the A.R.B.A.

Mr. Skelly, aided by some fifty committee and subcommittee members, will investigate state, city and local highway needs in Pennsylvania, with the objec-

tive of assisting in the formulation of a post-war construction program consistent with those needs. Emphasis will be placed on the urgency of getting final blueprints ready for highway projects.

The work in Pennsylvania will be integrated with the nation-wide program of the American Road Builders' Association, which has prepared a far-reaching economic study on highway construction and the place it must occupy in normal times as well as in periods of stress.

Because of war restrictions, highway construction has almost completely stopped, and maintenance is suffering from man-power and material shortages. All such factors will be weighed by Mr.

Skelly and his committee so that a sound post-war program for Pennsylvania can be established.

## Pressure-Treated Wood On Highway Projects

The use of pressure-treated wood in the highway field comprises one section of a new booklet on preserved lumber just issued by Koppers Co., Wood Preserving Division, Koppers Bldg., Pittsburgh, Penna.

One section of the booklet, which is entitled "Economic and Permanent Construction with Pressure-Treated Wood", explains the various processes by which

lumber is treated to protect it against decay, termites, fire, marine borers, and acids. Pictured are a number of recently completed pressure-treated highway bridges, one of which is typical of nine which were built for \$70,900 as compared with an estimate of \$212,000 for construction of other materials. A reference table of recommended uses of treated lumber for highways and other specialized fields is also included.

Copies of this new publication, designed as a guide in material selection for state and county highway engineers, may be secured direct from the company by referring to CONTRACTORS AND ENGINEERS MONTHLY.

## Buckets need Care ..

Of all mechanical tools the clamshell bucket gets more banging around than any other tool used by construction men.

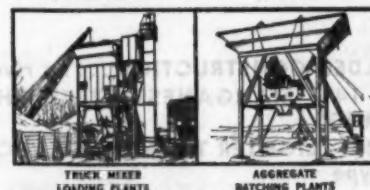
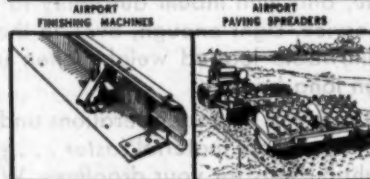
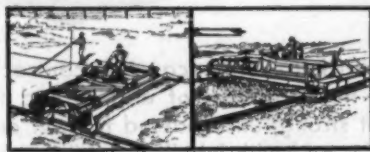
It is called upon to work under the toughest conditions, and to do jobs for which it was not intended.

Just a little attention and timely repairs — and your bucket will last its allotted life span.

### How to care for buckets

is completely described and illustrated in Blaw-Knox's Bulletin No. 1930, which is all ready to be mailed upon receipt of your request.

**Blaw-Knox Construction Equipment is doing a Vital War Job .....**



**BUY U. S. WAR BONDS  
AND STAMPS**

# BUCKETS ARE War WEAPONS

...keep yours on the job!  
...follow Blaw-Knox instructions

...this book tells you how

**BLAW-KNOX DIVISION** of Blaw-Knox Company  
2067 Farmers Bank Bldg. Pittsburgh, Pa.

☐ Send a copy of Bulletin 1930—"Maintenance and Care of Clamshell Buckets"

...The Serial Numbers of my Blaw-Knox

Buckets are: \_\_\_\_\_

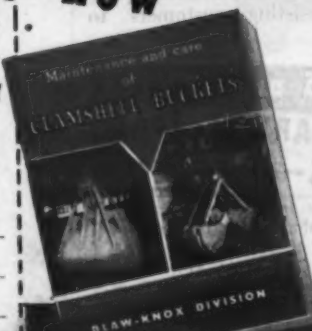
Company \_\_\_\_\_

Individual \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_





## Equipment Dealers Look to the Future

(Continued from page 2)

agree, the war ends in Europe first, some materials may be released for use here in this country, particularly for the maintenance of our essential transportation system and other necessary construction.

It is to the advantage of the construction industry that manufacturers of construction equipment have, in general, no serious plant-reconversion problem. As one manufacturer put it, his plant could be reconverted in the time required to change the paint in the paint shop from Army green to its characteristic peacetime color. The wartime production of most construction-equipment manufacturers has been that of their usual line and those which have taken on special production jobs for the Army or Navy have done so in addition to the manufacture of their regular construction equipment. Therefore reconversion in the construction-equipment industry will be less radical a change than in some other fields.

The limiting factor in reconversion will be the amount of materials available. Because of the vast amount of construction which will be required in the war-torn countries of the world, it is believed that control of critical materials may be continued for some time. However, many manufacturers have already discovered new materials which have been substituted for the so-called critical materials and which have proved entirely satisfactory and in some cases superior to those formerly used.

Another problem facing the equipment distributor is that of the disposition of the government-owned construction equipment for which the Government will have no use when the war is over. Much of this will have been transported overseas, and will probably be left there to aid in the reconstruction work of the countries in which it is then located. But there will be a lot of it in this country, and its disposition is one of the most serious problems facing the industry. Leaders in the industry are well aware of the seriousness of this problem, and it is hoped that sufficient action can be taken to prevent a "dumping" of this equipment at a time when it would ruin the construction-equipment market.

### A.E.D. Representative Speaks

T. W. Harron, President, Harron, Rickard & McCone Co., San Francisco, and Chairman of the Associated Equipment Distributors Post-War Planning Committee, sent the following special statement to **CONTRACTORS AND ENGINEERS MONTHLY**:

The construction-equipment distributor in normal times occupied a unique position in the distribution field. Construction equipment is not packaged goods and cannot be distributed as such; there are only certain items standard enough and small enough to be carried in stock in quantities. Generally, the distribution of construction equipment means assisting customers to

select the type of equipment best suited to handle a job effectively and economically. It means counselling customers as to features of design and operating functions of equipment, and assisting customers in laying out plants. It requires broad experience and intimate knowledge of the equipment offered, in preparing comprehensive specifications and sales proposals, and necessitates taking commercial responsibility, including the financing of projects running into considerable sums. It involves the trading-in of used equipment, and the rehabilitation and rental of such equipment, and its ultimate disposal. It includes a long range of responsibility to service equipment on the customers' jobs, often through years of operation.

All of these were the normal functions of construction-equipment distributors prior to the war. Along came the war, and equipment distributors met its challenge, putting their knowledge and experience at the disposal of the Government and in many cases investing huge sums of their own capital in new

equipment which, through rentals for use on Army and Navy projects, made a tremendous contribution to the rapid completion of war projects.

So things ran along fairly well at the beginning of the war, but suddenly the

distributor found himself on a spot. Well organized as he was to disseminate the engineering knowledge required to place the proper construction equipment on war projects, and well equipped to

(Concluded on next page)

Write  
For  
Details



## A TOUGH ROLLER FOR TOUGH JOBS

**Pierce-Bear 2-5 Tons  
Variable Weights**

Engineered for economical operation where the going is tough. Compact, easy to operate. Narrow rear roller gives heavy-duty compression. Built-in water tanks for wet rolling. Powered with Allis-Chalmers Industrial Heavy-duty Model "B" gasoline engine.

Manufactured by

**H. W. LEWIS EQUIPMENT COMPANY**

431 Haege Avenue  
SAN ANTONIO 3, TEXAS  
Phone: Garfield 6123

**20% to 40%  
lighter...  
type for type**

**Permits use of larger volume  
bucket on your machine . . .  
regardless of normal capacity!**



Here's the bucket every excavating contractor and dragline operator has dreamed of and wished for. A bucket that's light yet strong, unsurpassed for wet or dry digging, easy to handle, and with inbuilt durability to give years of trouble-free service. Light enough, even in the larger sizes, to maintain allowable loaded weight when used on small machines or on long boom.

If you want to speed up your operations under all digging conditions . . . move more material faster . . . you need Hendrix Lightweight Buckets for your draglines. Write today for descriptive literature, specifications and prices or ask your dealer.

1. ALL WELDED CONSTRUCTION . . . no rivets
2. 10% to 14% MANGANESE STEEL CHAINS and FITTINGS
3. 20% to 40% LIGHTER THAN OTHER BUCKETS, type for type
4. GETS FULL LOAD OF PAY MATERIAL EVERY TRIP even in wet digging
5. PERFECT BALANCE for ease of handling

**HENDRIX**  
*Lightweight* **DRAGLINE  
BUCKETS**

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

**TRANSITS and LEVELS  
HEADQUARTERS for  
REPAIRS—any make**

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog EC-811 of Engineering Instruments, Engineering Field Equipment and Drafting Room Supplies.

**WARREN-KNIGHT CO.**

Mfrs. of Sterling Transits & Levels  
126 N. 12th St. Philadelphia, Pa.



# Dealer Preparations For Future Business

(Continued from preceding page)

keep and maintain that equipment at maximum productivity, he came to the startling realization that there was practically no more new major equipment to be sold. Luckily the average construction-equipment distributor is a pretty tough and resilient being. Instead of going into a tailspin, he quickly realized that in order to keep the wolf from the door, he would have to skip, for the time being, new equipment sales and concentrate on rentals of used equipment, repair work on used equipment, rebuilding of equipment in use by the armed forces, and parts service (providing he could get the parts, which he usually couldn't). Over the country as a whole, there was not a great deal of this type of business, and the equipment distributor deserves a lot of credit for having kept his plant in operating condition, maintained his contacts with what will be the buying public after all this is over, and, except for the activities of the draft board, kept his organization intact.

He did all this with one main idea in mind. He realized that when this abnormal and unhealthy condition, brought about by the war, ends, the manufacturer is going to have to call upon strong distributor organizations to pick up the ball and carry it. The distributor is to be commended for tiding over this extremely unprofitable period, to hold himself in readiness to serve his customer and his manufacturer in the post-war period.

Having his house in order, to what does he look forward?

1. He looks forward to a post-war construction program of considerable magnitude, which should provide construction projects of all types, necessarily tabled because of the war.

2. He looks forward, in addition, to the development of construction projects over and above the present normal demand, projects which are keyed to the growth of aviation and new industry in this country after the war.

3. He looks forward to the day when his manufacturer will have something for him to sell, something new, more efficient, cheaper to operate, and perhaps even radical in design.

4. He looks forward to the day when he can hire young men returning from the armed services, who have been given a complete and excellent training and practical use of construction equipment. With his future built on the activities of these well trained youths, he is set to go forward with an industrial nation whose very industrial growth is keyed to construction projects of a nature undreamed of at this time.

## Time to Take Stock

Nothing is ever so good that it cannot be improved upon. This period of curtailed activity in the construction industry provides an excellent opportunity for the equipment dealer to take stock of his organization, his plant and operating equipment, his sales methods and

accounting systems, to be sure that they will be as modern and up-to-date as the post-war equipment he will have to sell.

Speaking at a New York Sales Meeting, J. J. Carroll, Treasurer of the Cleveland Tractor Co., put before the group the following questions:

1. Have you considered new products and new markets to increase your volume of sales, and have you reviewed your former methods with the objective of lowering costs in the future by correcting mistakes of the past?

2. Have you prepared a sound sales, sales promotion, and distribution plan?

3. Have you organized and planned for your salesmen and their territories after the war?

4. Have you surveyed your territory and prepared a list of prospects?

5. Have you prepared your initial post-war advertising to be released immediately after the cessation of hostilities?

6. Have you reviewed the financial stability of your company and provided for ample credit to finance your plans?

7. Are you keeping your capital as liquid as possible?

8. Are you maintaining contact with your banker in order that post-war credit lines may be available to you?

9. Have you inspected your premises both as to attractiveness from a sales promotion standpoint, and its efficiency from a service machinery standpoint?

10. Is your stockroom in good order and efficiently laid out for the prompt handling of parts in and out of your stores?

11. Does the old show room and office need some "touching up" and is some of your own equipment obsolete?

12. Is your accounting system adequate?

It behooves every construction-equipment distributor to ask himself these questions. If the answer is "yes", then he is well prepared for post-war business; if the answer to some of these questions is "no", this is a good time to improve that particular phase of his organization.

The future of construction-equipment

dealers, like that of all other businesses, rests on many factors, some of them still very uncertain and dependent on the course of world events, but one of the most important of these factors is sound practical adequate preparation now for the post-war period. Many equipment distributors individually and through their organization, the Associated Equipment Distributors, are making such preparation and can look forward with confidence to the post-war period when the construction industry can play its part in building a better and a peaceful world.

## Mack Official Joins WPB Advisory Group

The appointment of A. N. Morton, Vice President in charge of production for Mack Mfg. Corp., as a member of the advisory committee for the automotive, farm and tractor liquid-cooled gasoline-engine industry has recently been announced by the War Production Board.

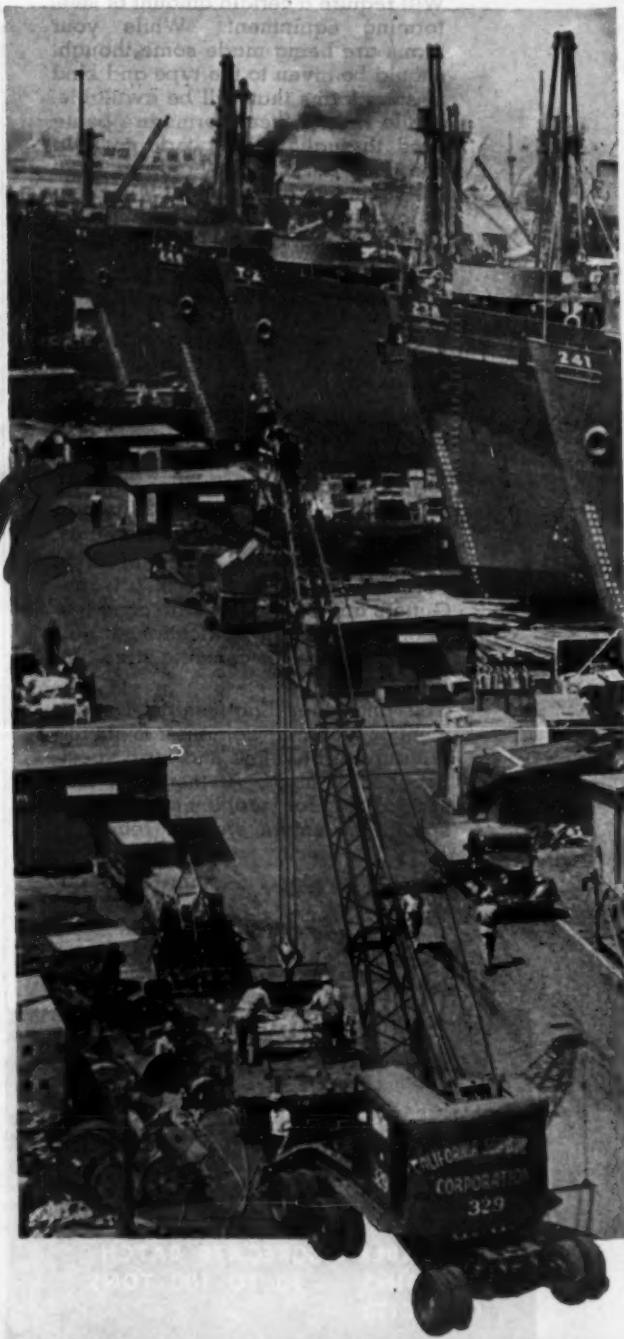
# 10 SHIPS IN 11 DAYS

## FORECAST

# THINGS TO COME

Recent launching of 10 ships in 11 days by the California Shipbuilding Corporation adds extra emphasis to forecasts of steadily increasing activity on all war fronts. And very much "on the job" in the continued record-breaking construction of Liberty ships at Calship is a fleet of 13 General Supercranes.

Mobility of General equipment . . . fast, accurate handling of all types of materials assured by Supercranes . . . conservation of manpower and fuel (General Supercranes are operated by one man, powered by one engine) forecast important "things to come" in post-war materials handling. At that time, you can again count on General Supercranes for your toughest, most exacting jobs just as today they are being called on to meet all the grueling demands of global war.



### STERLING PUMPS

BUILD FOR DEFENSE with STERLING PUMPS HOISTS and LIGHT PLANTS

Simple, Dependable, Rugged... the choice of leading contractors everywhere. Write for literature and prices.

**STERLING MACHINERY CORP.**  
405-13 Southwest Blvd. Kansas City, Mo.

The  
**OSGOOD**  
COMPANY

Sizes: 1 to 2 Cu. Yd.  
Diesel Oil Gas Electric

Associated with  
The GENERAL  
EXCAVATOR CO.

The  
**HERCULES**  
COMPANY

HERCULES  
IRONEROLLERS  
6 to 12 Tons  
Diesel or Gasoline

Associated with  
The GENERAL  
EXCAVATOR CO.

# GENERAL

Sizes: 1 1/2 to 3 1/2 Cu. Yd.  
Diesel Gas Electric

SHOVELS  
DRAGLINES - CRANES  
Crawler & Wheel Mounted

THE GENERAL EXCAVATOR COMPANY, Warren, Ohio



### Small Cargo Trailers For Tools or Materials

Ben-Hur industrial trailers, made by the Ben-Hur Mfg. Co., 634 E. Keefe Ave., Milwaukee 12, Wis., are two-wheel-mounted units for transporting tools, small pieces of equipment, supplies, highway traffic signs, and similar material behind a car or truck. They can be equipped as portable welding units, trailer tool boxes, water-tank trailers, or portable pumping units, to serve

any specific purpose of contractors or state and county highway departments.

Full information on this line of trailers may be secured by those interested direct from the manufacturer by referring to this text.

### Onan Progress in Pictures

A photographic record of its nearly 25 years of existence is contained in an attractive brochure prepared by D. W. Onan & Sons, 43-51 Royalston Ave., Min-

neapolis, Minn., manufacturer of electric generating plants. The company's first "one-man" shop has been expanded to five factory buildings, all now on full war production of electric generating plants which are providing light and power for all branches of American and Allied fighting forces. A dedication on the first page is addressed to the men of the organization now in the armed forces and to the men and women on the Onan production assembly lines.

Copies of this brochure may be se-

cured by those interested direct from the company.

### All-Year Traffic Striping

There is no single working season for the men engaged in painting the black center line and the yellow "no-passing zone" lines in Indiana. The same crews which put down the reflectorized yellow stripes in summer paint the black lines down the center in winter, using the same equipment.

## YOUR POST-WAR CONCRETE STREET and HIGHWAY PROJECTS

Will require a certain amount of steel forming equipment. While your plans are being made some thought should be given to the type and kind of steel forms that will be available. While Heltzel Steel Forms are being used throughout the world to help speed up our Victory Program, Heltzel Engineers are constantly seeking to improve or adapt this equipment to ever-changing construction conditions.

Certain new catalogs or bulletins are being issued from time to time incorporating these new concepts and specifications. Two Heltzel Bulletins are ready for you.

B-19 has to do with Steel Forms for Modern Concrete Highway and Airport Construction with complete information and specifications on attachments for Lip, Curb, Integral Curb and Header Curb attachments.

A-20 deals with all types of Steel Forms for Concrete Curbs, Curb-and-Gutters and Sidewalks with complete information and specifications on all types of forms for concrete street improvements.

You and your Engineering Department or Planning Commission should have these bulletins and form specifications at hand. If there are any special forming problems that need special treatment we are ready to serve you in any way possible.

Use the coupon . . . there's no obligation.

### HELTZEL SUPERIOR CONCRETE CONSTRUCTION EQUIPMENT

MILITARY HIGHWAY FORMS

AIRPORT FORMS

CURB, CURB AND GUTTER OR  
SIDEWALK FORMS

PORTABLE AGGREGATE BATCH-  
ING BINS — 30 TO 100 TONS  
CAPACITY

PORTABLE AND SEMI-PORTABLE  
BULK CEMENT BATCHING BINS  
FROM 100 TO 750 BBLs. CAP.

CENTRAL MIXING PLANTS

CEMENT TANKS TO 1500 BBLs.

TREMIE CHUTING

CONCRETE FLOOR HOPPERS

CONCRETE BUCKETS

Heltzel Steel Form & Iron Co., Warren, Ohio.

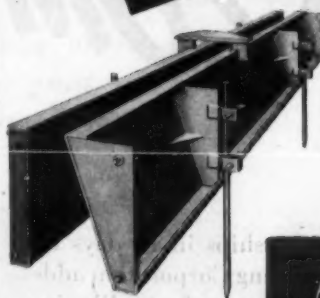
Send me catalog(s) indicated.

- ☐ B-19—Steel Highway and Airport Forms.  
☐ A-20—Steel Forms for Curbs or Curb and Gutters or Sidewalks.  
☐ Put me on your mailing list for new bulletins as they are issued.

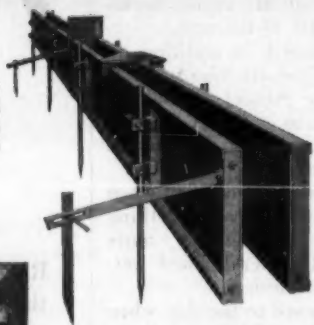
Name \_\_\_\_\_

Address \_\_\_\_\_

(Type of construction usually engaged in)



Steel Forms for  
Straight or Battered  
Curbs. Rigid and  
Flexible Radius  
Forms to match.



Steel  
Sidewalk  
Form



Rigid Radius Curb  
and Gutter Form.



Curb and Gutter Form with  
Single Bottom Radius  
Face Curb.

**HELTZEL** STEEL FORM & IRON CO.  
WARREN, OHIO • U. S. A.





C. & E. M. Photo  
Spreading slag from the special tail-gate of a dump truck backing over the freshly applied asphalt.

## Asphalt Resurfacing On Georgia Highway

(Continued from page 22)

surface of the hot asphalt as the truck was backed slowly over the freshly applied material. After the truck body was three-quarters empty, the truck stopped and then moved forward at a high speed to spot the voids that might have been left during the initial application of the slag.

The freshly spread slag was then rolled by a 7-ton Buffalo-Springfield tandem roller to key it into the asphalt. A heavier roller would crush the slag and destroy the non-skid surface texture. Following this, and as soon as the first rolling across the entire roadway had been completed, a drag broom was pulled over the surface to distribute any loose slag and fill spaces where the asphalt was not uniformly covered. This gang broom is 12 feet wide so that it is possible for traffic to go around it but still is wide enough to minimize the number of trips required to fill the voids. It is built of heavy lumber with the wire brushes attached to the under side and has hinges at the center so that it may be folded for ease in moving and also for storage on the shoulder when not in use. The broom is pulled by a truck and has hooks on both sides so that the truck can hook on the opposite side when it reaches the end of the run and not have to swing the unwieldy broom around on the road.

### Care in Making Joints

In order to be sure that the road would have a uniform appearance, every care was taken to eliminate fat spots at joints where the run of the distributor stopped and started up again. The contractor took care of that in an easy and effective manner, the result of experience with several other similar methods. It is common practice to put heavy paper on the road to catch the first flush of asphalt from the distributor, but heavy paper is as scarce as the asphalt itself now. To make it possible to use lighter paper and still secure the good results desired, the contractor tried using a long piece of corrugated roofing salvaged from an old building. This worked well for a time, but the corrugations wore off quickly as the metal was towed over the rough slag surface day in and day out. Now two sheets of "valley tin" or sheet-metal roofing are used with light paper, just strong enough to permit handling without danger to the men, on the roofing and with an earth dam all around the edge to hold the asphalt. By using two sheets of the "tin" there is less danger of the metal buckling and burning the men with the hot asphalt.

### Quantities and Personnel

The quantities involved in this 14-mile contract awarded to W. L. Cobb, Inc., of Decatur, Ga., were: 34,500 gal-

lons of bituminous material, AC-15, with a penetration between 50 and 150, and 1,980 tons of the No. 5 slag. The contractor worked 12 hours daily on this work with a crew of sixteen men and completed an average of 2½ to 3 miles a day. For the contractor, E. W. Hoskins was Superintendent. The contract was awarded by the State Highway Department of Georgia, G. T. McDonald, State Highway Engineer, and M. L. Shadburn, Maintenance Engineer, with Lewis W. Turner as Resident Engineer for this project.

### New Colombian Highway To Pacific Coast Port

Bogotá, the mountain capital of Colombia, 8,300 feet above sea level, will soon have a modern highway connecting it with Buenaventura, Colombia's principal Pacific Coast seaport. Only a few miles of this 420-mile highway remain to be completed, according to a recent announcement by the Office of Coordinator for Inter-American Affairs. Work is

being rushed with United States financial aid, and when the route is finished, it will be possible to travel by car from the coast to the capital in less than two days.

Until recently, the principal line of communication between Bogotá and the seacoast was by way of the Magdalena River and the port of Barranquilla on the Caribbean. The time required for the journey ranged up to six weeks, de-

pending on the stage of the river, and cargo was loaded and unloaded four times.

The railway which connects Bogotá and Buenaventura has a 70-mile gap in the middle, which is covered by a highway crossing the Q'indo Pass, some 12,000 feet above sea level. Both passengers and freight must now move by train, by automobile or truck, and then by train again.

### When Winter DECLARES WAR

be READY with your  
DAVENPORT-FRINK SNO-PLOWS



It won't be long now—until the annual struggle with snow calls for prompt and efficient action in keeping the highways OPEN. Check over your Sno-Plow equipment. If you need maintenance and repair parts, it will help you and ourselves if you place your orders EARLY. We will do everything we can to get the parts to you on time.

**DAVENPORT BESLER CORPORATION** Dept. A  
DAVENPORT, IOWA  
Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK

## Speed Drilling, Reduce Costs with Regular Lubrication



Although rugged and powerful... designed for heavy duty, high speed, deep-hole drilling... CP G-200 Wagon Drills are easily and quickly operated by one man. They need but little maintenance care — but they do need that little! Keep them tight and lubricate them regularly.

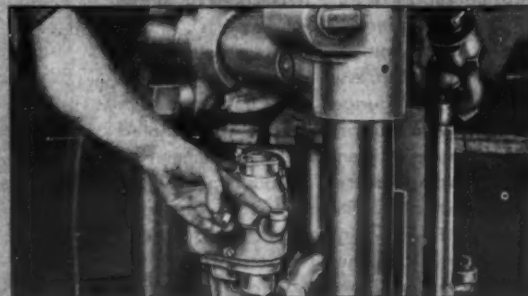
### HOW TO GET MAXIMUM SERVICE FROM YOUR CP WAGON DRILL



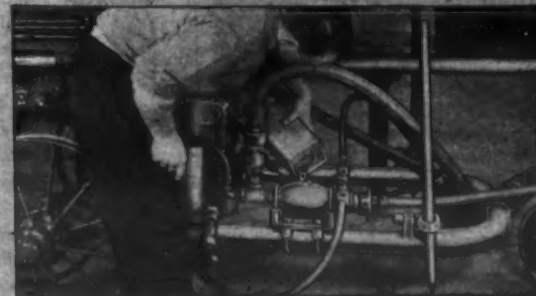
1 Put about four ounces of fairly heavy oil in the gooseneck and blow through before starting work.



2 Fill rock drill oil reservoir with half a pint of right grade of rock drill oil before every shift.



3 Check gear case frequently, keep filled to plug level. Should have regular attention once a week.



4 Always fill the line oiler twice each day when wagon drill is in operation. Capacity, one pint.

★★★★★★  
PNEUMATIC TOOLS  
ELECTRIC TOOLS  
(Hicyle...Universal)  
ROCK DRILLS

**CHICAGO PNEUMATIC**  
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★  
AIR COMPRESSORS  
VACUUM PUMPS  
DIESEL ENGINES  
AVIATION ACCESSORIES



## Fine Grade and Forms On Penna. County Road

(Continued from page 9)

paving. The latter is reinforced with three 1/2-inch round rods, 6 inches on centers and 5 feet 9 inches long, at 5-inch intervals and 1 1/2 inches from the bottom of the slab, which is 10 inches thick where it joins the pavement and 5 inches thick at the center over the tile drain.

A continuous underdrain is placed in a trench beneath the center strip, with catch basins at intervals of approximately 300 feet. These are set with the slots of the grilles parallel to the road to offer the best opportunity for water to enter the basin.

### Drainage

Continuous perforated vitrified-clay tile was laid along the shoulder in all cut sections. Most of the trench for this tile was dug by a Parsons Model 25 trench excavator working in shale. Where the rock was too hard for use of the trench excavator, the trench was broken by busters operated by an Ingersoll-Rand 220-foot portable air compressor.

In those sections where an outer curb was built, the curb trench was excavated against the paving by a Buckeye wheel-type excavator. This same machine, when operating on a 4 1/2-foot ditch for pipe line in hard clay, excavated 150 feet of trench per hour.

### Grading and Form Setting

The largest cut on the job was all rock and fire clay 120 feet deep. It was excavated by breaking up the material by drilling, rooting, and then excavating with a 12-yard LeTourneau Carryall scraper, which was used for all the rough grading and shoulder work on the job. This rough grading and drainage work was performed under Section 4, Contract 2, in 1942 by Frank Donatelli & Co., Inc., of Pittsburgh, at a cost of \$438,061.00.

In the fine grading performed by the paving contractor, a Caterpillar No. 12 power grader did the finish work on the shoulders and the first fine grading between the forms. The fill was all rolled by a 10-ton 3-wheel Buffalo-Springfield power roller, while fine grade was rolled

by a 7-ton tandem of the same make.

After the power-driven Cleveland Formgrader had cut the form trench to line and grade, the crew of ten men, including those required for lining up the 10-inch Blaw-Knox and Heltzel forms, set the forms and drove the pins. This latter operation was handled in an unusual fashion, in our experience, as the subgrade was so hard that driving the pins by hand sledge would have required a much larger crew. Instead, the Traxcavator, used to remove excess earth between the forms, was used in its idle time to pull a small portable air compressor which supplied air for running a jackhammer with a special head to drive the form pins. This required the tractor driver on the Traxcavator, one man with the hammer, a helper on the hose, the boss form-setter who checked the line of the forms, and one laborer who moved the forms, as required, with a crow bar.

Ahead of the R-B Finegrader which cut the subgrade, two men of the form-setting crew packed the heavy shale be-



C. & E. M. Photo  
Because of the very hard clay subgrade, a jackhammer with a special head was used to drive the form pins on the McKnight Road project.

neath the base of the forms with mat-tocks. This was very effective, as the

forms were only slightly disturbed by the action of the R-B subgrader as it removed the hard subgrade material and cast it over the outside form. The Finegrader pulled a device for the first check on the high and low spots in the grade. This was followed by a crew of eight men hand-shoveling the excess material left against the forms by the subgrader, and then after the rolling, these men again checked the subgrade ahead of the paver.

A crew of five men from the form-setting crew pulled the forms the morning after the pouring of the slab, using a pair of heavy-duty form pullers on each form.

### Pouring the Slabs

Batches, including the cement, were furnished by the contractor's associated company, McCrady-Rodgers Co., a commercial producer of crushed aggregates. The batches were delivered by a fleet of ten trucks, of which all but two were 4-batch units and the others 2-batch.

(Continued on page 56)

### From Start to Finish SCHRAMM Offers Economical Speed . . .

To match the new, fast speed of modern engines, Schramm Air Compressors are equipped with seven main bearing supports . . . a mechanical intake valve . . . more cylinders . . . lighter parts . . . and forced feed lubrication . . . to give you a light weight, compact compressor that spells "speed" in any construction language!

Both engine and compressor are watercooled and give the same efficient operation, summer or winter. Easy starting—merely by pushing a button—is another distinctive Schramm feature, as is the compactness and light weight of each unit. For details on Schramm's long line of air compressors for any air requirements, write today requesting Bulletin 42-PA.

**SCHRAMM INC.** WEST CHESTER  
PENNSYLVANIA  
THE COMPRESSOR PEOPLE

## CUMMER ASPHALT PLANTS

EIGHT SIZES

Up to 1000 Tons per day

DRYERS

Two-Fire and Internal Fire

30 to 100 Tons per hour

Electric Batch Timers

50 Years' Experience

THE F. D. CUMMER & SON CO.

EAST 17th & EUCLID  
CLEVELAND 15, OHIO



### Safety Program Booklet Issued by Contractor

To acquaint its construction superintendents, foremen, safety engineers and other key men with all aspects of its safety program, the Austin Co., engineers and builders of Cleveland, Ohio, has recently issued a most interesting 24-page booklet, which encourages increased attention to all matters concerning safety on Austin jobs.

As is pointed out in this booklet, efforts

to make the construction industry just as safe as any other are really proving effective, in spite of its many special problems. Many years ago safety was practically synonymous with sissy in the minds of many people. The fact that this is no longer so is due in part to the leadership of such outstanding companies as The Austin Co. and others, who have instituted safety educational programs and insisted that their jobs be done not only well but safely.

The change in attitude toward safety

is illustrated in a description of the safety set-up on a recent 7,500-man Government construction project. The Austin Co. had on the job a safety engineer, five safety inspectors, and a five-man safety crew. The insurance company provided two doctors, eleven registered nurses, a safety engineer and an assistant safety engineer, while the Government added a safety engineer, a fully equipped hospital, three field First-Aid stations, a doctor's car, an ambulance, and a station wagon.

### Vitrified-Clay Sewer Pipe And Fittings Standardized

The simplification and standardization of vitrified-clay sewer pipe and fittings recently announced by the War Production Board will reduce the number of sizes from 21 to 13 and of specifications from 5 to 2. This action is taken by Limitation Order L-316 which is expected to result in a saving of 2,308,775 man-hours per year and in considerable conservation of materials.

## ASK THE SOLDIER WHO USED ONE



The Barco Portable Gasoline Hammer is taking a beating! It's taking a beating at the hands of experts... the Army Engineers, the Army Signal Corps, the Marines... around the world. We're proud to report that the Barco Hammer is not only "taking it", but it is "dishing it out" so satisfactorily that nearly our entire production is going to the armed services.

So after this war, just ask a soldier who used a Barco Portable Gasoline Hammer. Ask him about its ruggedness, its easy operation, its extreme portability! He'll give you the same straight answers we've been receiving.

Barco Manufacturing Company, Not Inc., 1801 Winnemac Ave., Chicago, Ill.

In Canada: The Holden Co., Ltd.,

# BARCO PORTABLE GASOLINE HAMMERS



## Construction Equipment On Every Fighting Front

Citing how tractors and other construction equipment have helped to crack enemy defenses in Sicily, Tunisia, the South Pacific, and in the Aleutians, Colonel H. A. Montgomery, Executive Officer of the Supply Division, U. S. Corps of Engineers, recently told supervisors at the Caterpillar Tractor Co., Peoria, Ill., of the remarkable construction feats being accomplished on every fighting front.

Among those he mentioned were the construction of a 12-mile supply road in three days through northern Sicily ter-

rain which would "bow the legs of a mountain goat"; building a 35-mile road in Tunisia which led French General Giraud to remark, "Those crazy American engineers, they could build a two-lane highway right into the front lines"; and the conversion of a wheat field in Sicily into a landing field in 24 hours. Before the field was completed, two planes in trouble were able to land on the clearing and as the tractors and bulldozers made their final run, a squadron of American fighter planes landed and took over.

Although experts had figured the job of building an earth fill across a ravine to by-pass a wrecked bridge in Tunisia

would take three weeks, American engineers and equipment did the job in nine days, in the face of heavy rains and the German Air Force. At a base at Amchitka in the Aleutians, the Japs bombed a landing field three times in one night, but the damage was repaired as quickly as it occurred.

## Aid to Proper Lubrication Of Contractors' Equipment

By means of diagrams, models, action pictures, and text, the proper lubrication of a variety of earth-moving and land-clearing equipment is indicated in a booklet entitled "Lubrication Data on

Contractors' and Agricultural Equipment", issued by the Amalie Division, L. Sonneborn Sons, Inc. Covering tractors, hoists, pavers, excavators and equipment for tractor mounting, this booklet indicates in the first section the lubrication points of these various types of equipment, while the second part is devoted to lubrication specifications for the different parts and points requiring lubrication, suggesting the proper type of Amalie lubricant for each point.

Copies of this helpful booklet may be secured by those interested direct from the Amalie Division, L. Sonneborn Sons, Inc., 88 Lexington Ave., New York City. Just mention this item.

# NOT ON YOUR PAYROLL

*but he's behind you all the time!*

## The IOWA DEALER

# Cedarapids

**Built by IOWA**

## THE IOWA LINE

of Material Handling Equipment Includes

- ROCK AND GRAVEL CRUSHERS
- BELT CONVEYORS—STEEL BINS
- BUCKET ELEVATORS
- VIBRATOR AND REVOLVING SCREENS
- STRAIGHT LINE ROCK AND GRAVEL PLANTS
- FEEDERS—TRAPS
- PORTABLE PLACER MACHINES
- PORTABLE POWER CONVEYORS
- PORTABLE STONE PLANTS
- PORTABLE GRAVEL PLANTS
- REDUCTION CRUSHERS
- BATCH TYPE ASPHALT PLANTS
- TRAVELING (ROAD MIX) PLANTS
- DRAG SCRAPER TANKS
- WASHING PLANTS
- TRACTOR-CRUSHER PLANTS
- STEEL TRUCKS AND TRAILERS
- KUBIT IMPACT BREAKERS

**IOWA MANUFACTURING CO., CEDAR RAPIDS, IOWA**

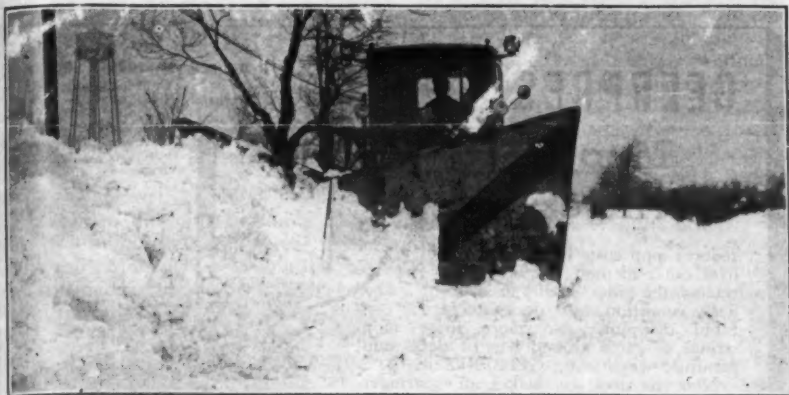
**T**HERE is a man with the answers in your territory. He's a real part of the Iowa organization. He's your Iowa Cedarapids Dealer.

Dealer organizations with all the necessary ramifications for service don't just happen. Your dealer today has taken seriously his job of helping to keep the construction industry equipped. He has met the need with investment in machinery, and increased facilities for better service, and he has done this in the face of daily increased difficulties in securing the proper help.

Your dealer is a solid citizen with a real interest in his community. He is behind you with trained personnel that understands your problems both from the standpoint of your needs in planning and purchasing, and for maintenance.

He is ready with the right parts and assistance to keep your machinery on the job. He is your friend with advance information on future contracts. He can help you apply for a new machine for war essential work, and, if you can't secure new equipment, he'll strain heaven and earth to keep your old equipment running. Count on your Iowa Dealer.





Board of Wayne County Road Commissioners Photo

Snowfall is heavy and snow removal vital to the war effort in Wayne County, Michigan. In the winter of 1941-42, the County's snow-removal and sanding operations were so heavy that they required the equivalent of one piece of equipment working 24 hours a day more than 1,000 days.

### Snow Removal Vital In War-Plant Area

In the war-industry area of Detroit, Michigan, Wayne County's system of highways plays an important part, and one of the county's most essential services is keeping the roads clear of ice and snow during the winter months. The magnitude of this task is indicated somewhat in the recently published 36th Annual Report of the Board of Road Commissioners of Wayne County for 1942.

During the period covered by the report, the official snowfall was over 23 inches. Snowfall for the three winter months was

December, 1941	9.1 inches
January, 1942	3.3 inches
February, 1942	9.6 inches

while the average amount of snow on the ground during the same period was

December, 1941	9.1 inches
January, 1942	10.7 inches
February, 1942	9.6 inches

Unusual conditions during that period kept the snow on the ground until the next snowfall, and each succeeding snowfall drifted badly in the open country, necessitating the continuous use of snow-removal equipment to keep roads open and clear. In the northwest section of the county, the drifts reached heights of 5 to 6 feet. Under normal conditions, Wayne County roads are clear of snow within 8 hours of a snowfall, but because of the unusual conditions in 1942, some of the out-county roads were not opened until 24 hours later. Because of the importance of transportation to and from war plants, the routes serving the war-industry area were cleared first and as quickly as possible.

R. H. Steketee, Engineer of Highway Maintenance for Wayne County, reports that during the 1942 season approximately 72 pieces of equipment were used for snow removal, working a total of more than 24,000 hours. This is an average of over 335 hours per piece of equipment, or the equivalent of one piece of snow-removal equipment working 24 hours a day for more than 1,000 days.

### New Small Bridges For Post-War Roads

The preparation for post-war highway programs by state and county highway departments involves an inventory and study of all small highway bridges, many of which were obsolete before the war began and which have been subjected to unusually heavy traffic during the emergency. To aid highway departments in planning their structures for post-war construction, the Toncan Culvert Manufacturers Association has just issued a practical and valuable booklet entitled "Planning Small Bridges for Post-War Construction".

To help in gathering the necessary field data, a "Small Bridge Inspection Report" form has been prepared and is available on request. This provides space for reporting the type, size, present condition, repairs needed, and data for total replacement when necessary, so that such information will be available in

handy form when future bridge plans are under consideration.

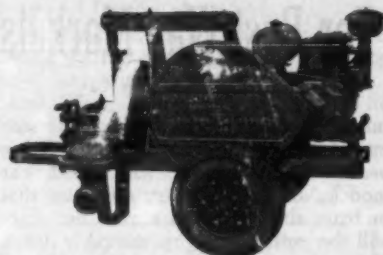
This new booklet suggests that, because the repairing or rebuilding of small bridges and culverts is one of the

best sources of post-war projects, a complete inventory of such structures should be made now, and a "Manual of Instructions for Inspection and Rating of Bridges" has also been prepared, together with charts, graphs, tables and all necessary forms to assist highway engineers and officials in planning their post-war improvements. It is pointed out that, by pre-planning the program and details now, it will be possible not only to provide job-making public projects but also improvements which will be worthwhile community investments.

Copies of this booklet "Planning Small Bridges for Post-War Construction", as well as copies of the inspection report forms and the manual of instructions on reporting and rating structures, may be secured by state and county highway engineers without obligation direct from the Toncan Culvert Manufacturers Assn., Box 6778, Cleveland, Ohio, by mentioning this item.

Buy a share in freedom through the regular purchase of War Bonds.

### 4" Single Mud Hog Pump on Pneumatic Wheels



The "Old Reliable" Mud Hog brought up to date.

Gearing enclosed—running in oil.

All cut gearing.

Die-forged crankshaft in pump.

Available for the duration in ball valve force type only. Flat valve open discharge discontinued for the duration.

Send for Bulletin No. CEM-40-E

**MARLOW PUMPS** RIDGEWOOD, NEW JERSEY



Dear Mom:  
I'm among old friends way  
over here ~ today a B-G plant  
& I helped assemble when  
Barber-Greene!

We have had to learn to walk and to save fuel and stop over-eating. Prices are going up with taxes. We at home — among familiar scenes and faces—are having it "tough."

But Harry, our office boy, wrote of the thrill he got meeting a Barber-Greene Ditcher as he marched into Bizerte. He, and 126 other Barber-Greeneers in Service write us with nostalgia of meeting Barber-Greene machines on foreign soil. To them, those pounding, unlovely masses of welded steel represent HOME. To them, in Africa, Sicily,

the South Pacific, Alaska, Greenland, Iceland, those machines working in burning sands, coral atolls, or frozen tundra are the one familiar sight. Home!

Those in service inspire us—as they must all producers of war goods — to "E" production and "Star" production. As we get more and more of these reminders of home — American construction equipment,—out of the plants to the front, we will hasten that day when home is really home, and not just a memory inspired by a mass of steel at Bizerte, Berlin or Tokyo.

43-4

**BARBER-GREENE**  
AURORA, ILL.



## Definite Plans Made For Post-War Markets

(Continued from page 25)

in the automotive industry, motor-car manufacturers have decided to resume peacetime production with 1942 car models, and the industry estimates that in from six months to a year new cars will be rolling off the assembly lines. This industry looks forward to a period of the greatest business it has ever known. It is reported that cars are being scrapped at the rate of 100,000 to 150,000 a month and that it would take a year to replace all the cars junked since the war began, if the unprecedented production figure of 6,000,000 cars were reached in the first full year. In addition, there are all the cars still rolling, but which will be discarded for new ones as soon as they are available, plus the financial reserves of many people who for the first time in their lives have money enough to buy a new car.

A similar plan of action in the electrical-appliance field is reported by Westinghouse. This company's post-war planning covers two stages: first, the production as soon as possible after the war of those civilian products which they made before the war, improved but not radically changed; and second, to bring along revolutionary new developments as quickly as they can be proved.

Most manufacturers have established post-war planning committees within their organizations, or delegated one or two executives to study the problem. In the construction-equipment field, post-war production will be of pretty much the same machines which have been doing so good a job on war construction projects, and the post-war planning is being devoted to administrative problems and market development. However, there are certain trends in equipment which will no doubt be evident in the post-war models. Streamlining and compactness are two features of much of the equipment produced for the Army and the Navy which will find favor among contractors when they can once more buy new equipment; even greater ruggedness and the ability "to take it" will be characteristic of our new equipment; and accessibility of parts and ease of maintenance and repair will bring joy to the hearts of the men charged with such jobs. These features will characterize much of the new equipment which will be available first; as in the automotive and electrical-appliances fields, the startling new developments will come later.

### Market Expansion

With construction high on the list of post-war activities, there should be a world-wide market for construction equipment. In the first place, practically all of the construction and highway maintenance equipment in this country will be obsolete and worn out by the end of the war, because of the terrific demands being made upon it for essential construction and the maintenance of our highways during the war years.

Photographs of bomb damage in other countries present a small but graphic picture of the gigantic reconstruction job to be done in Europe, in Russia and China, in North Africa—in fact all over the world. The necessary reconstruction in damaged and devastated areas, and the development of hitherto backward areas will require vast quantities of construction equipment. To many of these places, the war will have brought American machines for the first time, and their efficiency and ease of operation have been their own best "salesmen" for their future use. Not all of the world market for construction equipment will be ours; but it is vast and we can have a goodly share of it.

Already many companies are developing their export markets, and a survey conducted by the Office of the Coordinator of Inter-American Affairs and the Department of Commerce reveals a surprising increase in export advertising in the other American republics. Trucks, tractors, engines, tires, steel products, gasoline and lubricants, electrical appliances, are only some of the many United States products being offered to the other Americas via radio and newspapers. Since none of these are available now, this is strictly "post-war planning"—in some cases an effort to keep a pre-war market, but in many to develop an entirely new field of business activity.

### Disposition of Govt. Equipment

The problem of what will be done with the vast amount of government-owned construction equipment is one of vital importance. Much of it will be in foreign lands, and should be left there to aid in the immediate reconstruction tasks. Some which will still be here in this

(Concluded on next page)

## GEERPRES Mop Wringer

reduces mop costs from 25 to 50% over other methods of wringing—retains the mop fabric in a soft fluffy condition most desirable for rapid mopping. No more loose mop strings to catch around legs of desks and furniture when using GEERPRES.

New construction makes this wringer last for many years. Two popular sizes cover the entire commercial field. No. 1624 model will wring mops 14 to 24 oz. incl. No. 2436 model will accommodate mops 20 to 36 oz. incl. SEND FOR FREE CIRCULARS.

**GEERPRES WRINGER, INC.**  
Manufacturers of High Grade Mopping Equipment  
MUSKEGON, MICH.



## Save Seconds Every Trip



### DUMPTORS PROVIDE SPEED VITAL TO WAR CONSTRUCTION

The operator merely trips the lever, and he's ready for another trip . . . that's how seconds are saved on every load. The Koehring Dump-tor has no complicated mechanical body hoist arrangement . . . no delays . . . no hoist repair worries. The load is dumped exactly where you want it . . . when you want it . . . because it's simple and instantaneous. Traveling forward or reverse with three speeds either way helps keep lost time at a minimum.

**KOEHRING COMPANY**  
Milwaukee, Wis.

*Depend* on your Koehring distributor to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.



**HEAVY-DUTY CONSTRUCTION EQUIPMENT**



## Keep Free Enterprise In Post-War Business

(Continued from preceding page)

country might well be shipped overseas for a similar purpose. Certainly some orderly plan for the disposition of not only construction equipment but the vast stores of materials which will be in government hands at the end of the war must be worked out, to prevent serious economic repercussions in this country. So vital is this problem in the construction industry that it will be discussed separately in a later issue.

### Conclusion

Speaking before the Stevens Alumni Association, Arthur W. S. Herrington, Chairman of the Board of the Marmon-Herrington Co., said:

"We, the people of the United States, are the ones who will determine the nature of our post-war country. It seems improbable that we should permit a mere handful of large and power-hungry competition-fearing monopolies to plunge us into the facism our boys are now giving their lives to eliminate from this earth. It is equally unlikely that our solution will be found in tearing up the system of free enterprise which has done much to bring us to our present position, and substitute for it some untried socialistic and communal form which is the brain child of a theorist who has had no contact with industry and its components. Equally unacceptable to us will be any scheme of negative solution which presupposes the necessity of a reduction of our accepted high standard of living. In this free land of ours, the only barriers to the development of opportunities are the failings of men themselves."

Henry J. Kaiser, well-known contractor and even better-known shipbuilder, said at the New York Herald Tribune Forum on Current Problems last year, "The production that is necessary to sustain mankind comes about when men operate under a minimum of restraint; when they are given the opportunity to risk and venture; to lose as well as to gain; to strive, yes, to compete; and most of all to escape the compulsions of excessive government. This is no idle plea for a return to rugged individualism or laissez faire. We have already learned to temper the brutality of competition by the spirit of fair play. From long personal experience, I know that even the most competitive of men have the capacity and the will to cooperate."

Most business men have no desire to return to the "good old days", for a careful analysis of those days, which in retrospect look golden, shows the evil and the mistakes which were there too,

and which led to the present world conflict. Thinking people are looking forward to a better and more productive era, in which we retain and cherish the traditions of the past which have made this country great and eliminate forever the mistakes—the selfishness, the narrow nationalism, the petty bickering, and the refusal to accept our full share of responsibility for justice and decency and peace in the world.

Industry wants to plan for the future, and wants to know what kind of a future to plan for. But unless this country takes its place in the family of nations, industry will have only one thing to plan for—the start of the greatest rearmament program in history, and the next war. Plans for conversion to and production for a peacetime economy are possible only if we cooperate with the other United Nations to insure no more war.

*Never has the proper care of equipment been so important. The machines you now have must last for the duration, so take care of them.*

### New Kotal Sales Manager

The appointment of Francis P. Smith, Jr., as Sales Manager has been announced by the Kotal Co., New York City. Mr. Smith, who has been active in the asphalt industry for 26 years, was originally associated with his father's firm, Dow & Smith, paving consultants of New York, later served with the Texas Co. and then the Union Oil Co. of Cali-

fornia, becoming Manager of the Asphalt Department, and eventually organized his own contracting firm, Smith & Day of Los Angeles, Calif.

Most recently Mr. Smith has been a senior business specialist for the Office of Price Administration and the Petroleum Administration for War, where he compiled the Maximum Price Regulation No. 323, working in cooperation with the asphalt industry.

## Para-Plastic

**HOT-POURED RUBBER-LIKE  
WATERPROOF  
SEALING COMPOUND**

After many months of research Serviced has developed a VICTORY PARA-PLASTIC composed of non-critical materials (no rubber) and conforming fully with Federal and Civil Aeronautics Association specifications.

VICTORY PARA-PLASTIC bonds firmly with concrete, steel or wood and serves as a joint or crevice sealer against infiltration of water. It is not affected by ordinary extremes of summer or winter weather.

To ENGINEERS AND CONTRACTORS:

Additional information and specifications on request

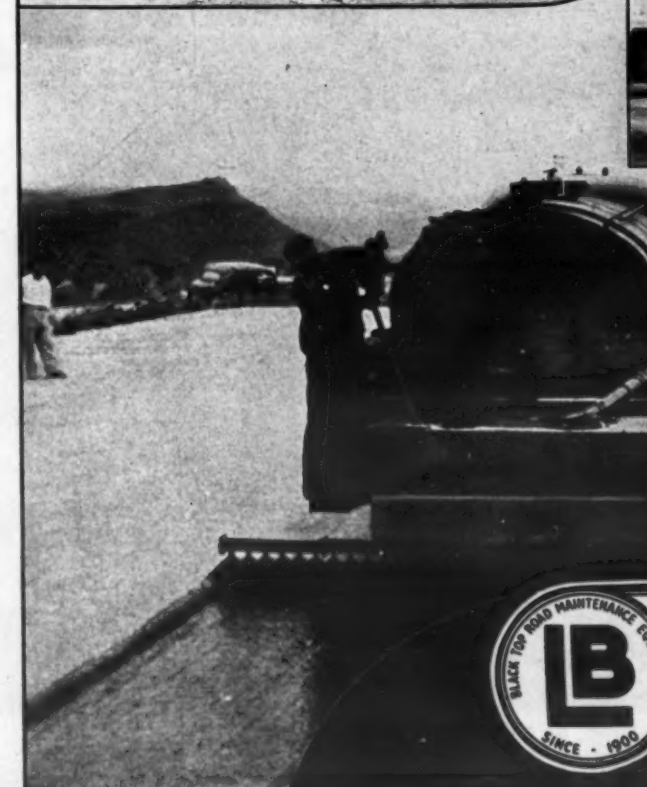
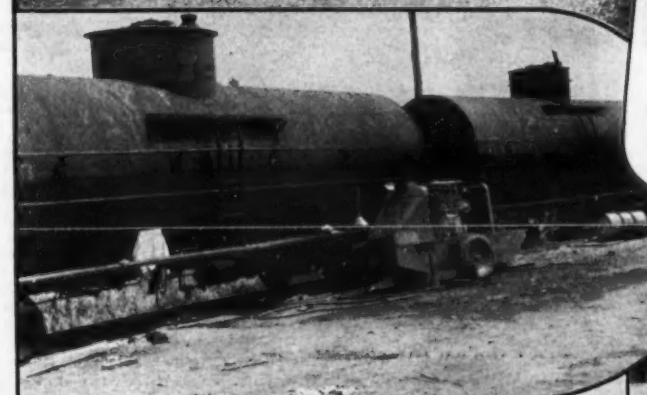
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**SERVICED PRODUCTS CORPORATION**

Pioneers in the Manufacture of Approved Construction Materials for over twenty-three years.

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Chicago, Ill.

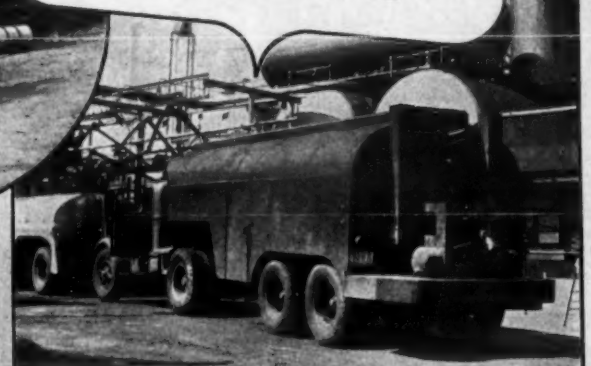


## THEY'RE FIGHTING FOR VICTORY

Littleford Black Top Construction and Maintenance Units are fighting all over the world for Victory. They are building Runways, Roads, Highways, etc., to speed the day of peace. Pressure Distributors, "Tanker" Heaters, Road Brooms, and Supply Tanks are in all theatres of War.

After Victory these proven Littleford Units will again speed up the Construction and Repair of our Highways and Airport systems. On the battlefield and at home, Littleford units give the most efficient results. Remember to purchase your Post War Black Top Construction and Maintenance Equipment that bear the Littleford Trademark.

Upper Left, Road Broom—Lower Left, "Tanker" Heater—Bottom, "Spray Master" Pressure Distributor—Right, Bituminous Supply Tank



## PILE HAMMERS and EXTRACTORS HOISTS—DERRICKS WHIRLERS

Special Equipment  
Movable Bridge Machinery

Write for descriptive catalogs.

McKIERNAN-TERRY CORP.  
19 Park Row, New York

Distributors in Principal Cities

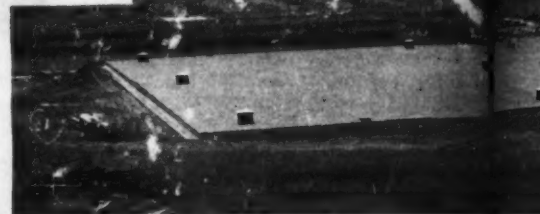
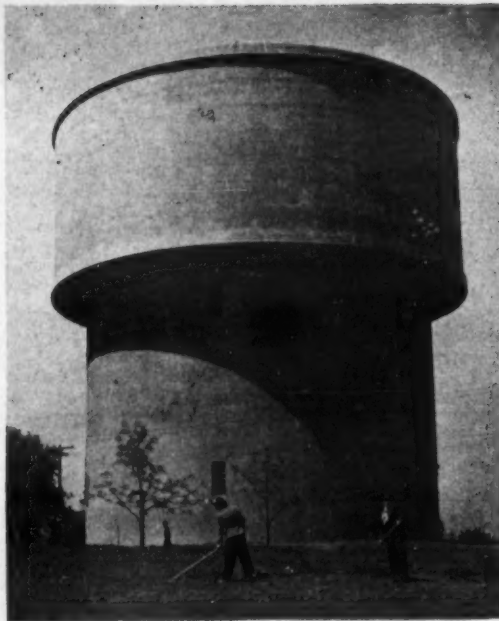
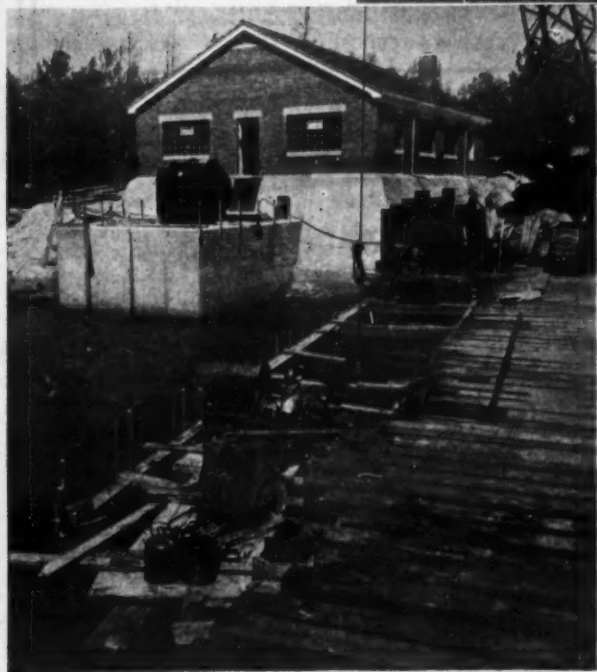
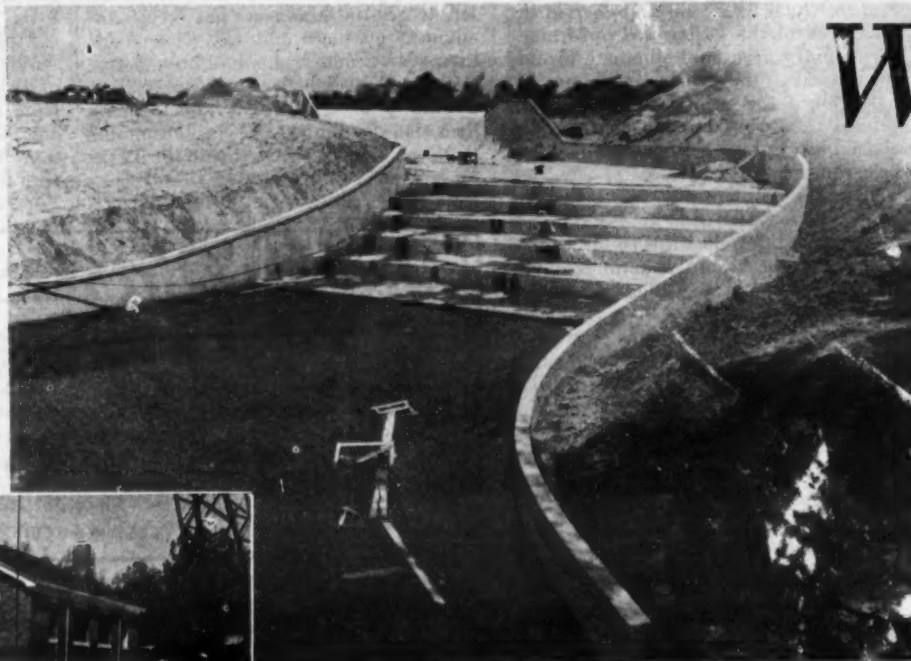


**LITTLEFORD**

LITTLEFORD BROS., INC.  
485 E. Pearl St., Cincinnati, Ohio



**NEW SUPPLY.** The concrete spillway at Lake Burnt Mills, Va., at right, a portion of the dam and reservoir project to feed water to Lake Prince, major source of supply for the Norfolk, Va., area. Below, steel sheet piling cofferdam for the installation of 30-inch reinforced-concrete pipe across Blackwater River, part of the new water-supply system for Norfolk and Portsmouth, Va. The pumping station and intake are seen in the background.



**STORAGE.** Above a general view of a completed covered reservoir which holds the 15,000,000 gallons of water required each day by an airplane plant in Ohio.

**TANK.** Left, an 800,000-gallon concrete water tower, part of the water-supply system for the Great Lakes Naval Training Station.

**RESERVOIR.** Right, the 8,000,000-gallon filtered-water reservoir on Minor Hill in Arlington County, Va., part of the F.W.A. \$660,000 project to increase the water supply for this area.

**FILTRATION PLANT.** The new water filtration plant at Harwood Mills, Va., below, showing the flocculators at the left and in the foreground part of the spillway of the Harwood Reservoir. At left, carpenters erecting forms for the concrete sedimentation basin at the Harwood Mills plant. This is another F.W.A. public-works project to provide additional water for war industries and military installations, and involved the expenditure of more than \$12,000,000.



**TRENCH.** A 4-foot cut-off trench rock spillway section at the Va. reservoir serving Newport, R. I. Forms left with the spillway are seen in the center and start wall for the main

# Water forth

Greatly Increased Water  
For War Industries and  
Necessitated Crucial  
Water Supply Projects

Federal Works Photos



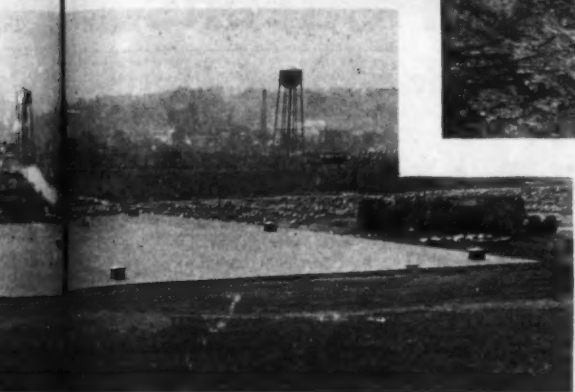
# On the War

Increased Water Consumption  
at Military Camps  
Construction of 300  
Mile Pipe by F. W. A.

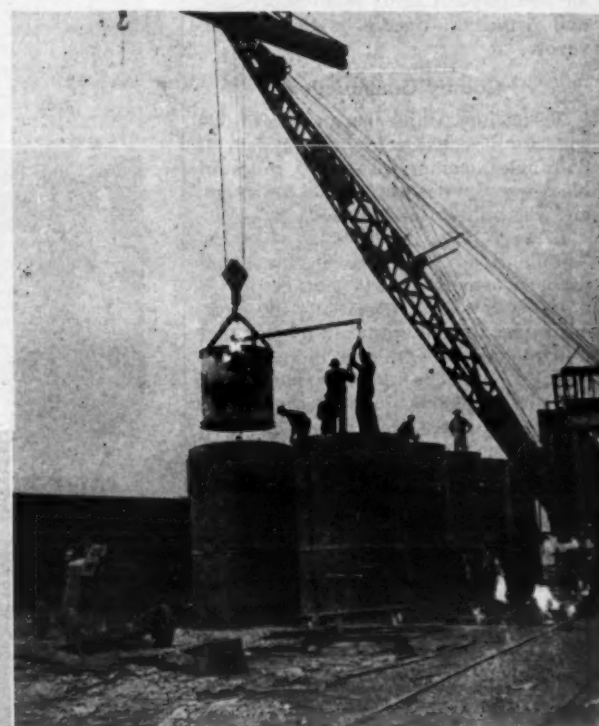
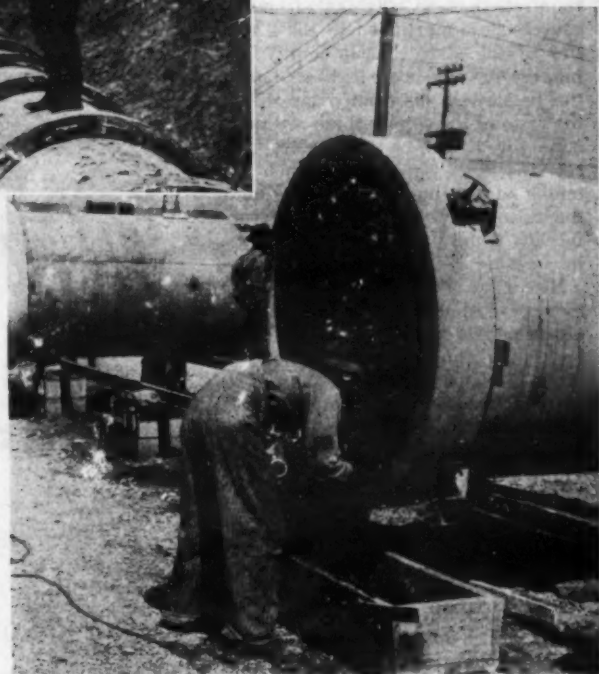
General W. H. Photos



**PIPE LINE.** Looking west at Gum Gulley Siphon, at left, during the construction of the Houston, Texas, water-supply project to serve Harris County war industries. Below, caulking the collar on a 40-inch pipe in the Houston line. This water-supply project, which includes a 19-mile and a 16-mile gravity flow canal running from an intake in the San Jacinto River to either side of the industrial area, will provide 85,000,000 gallons daily.

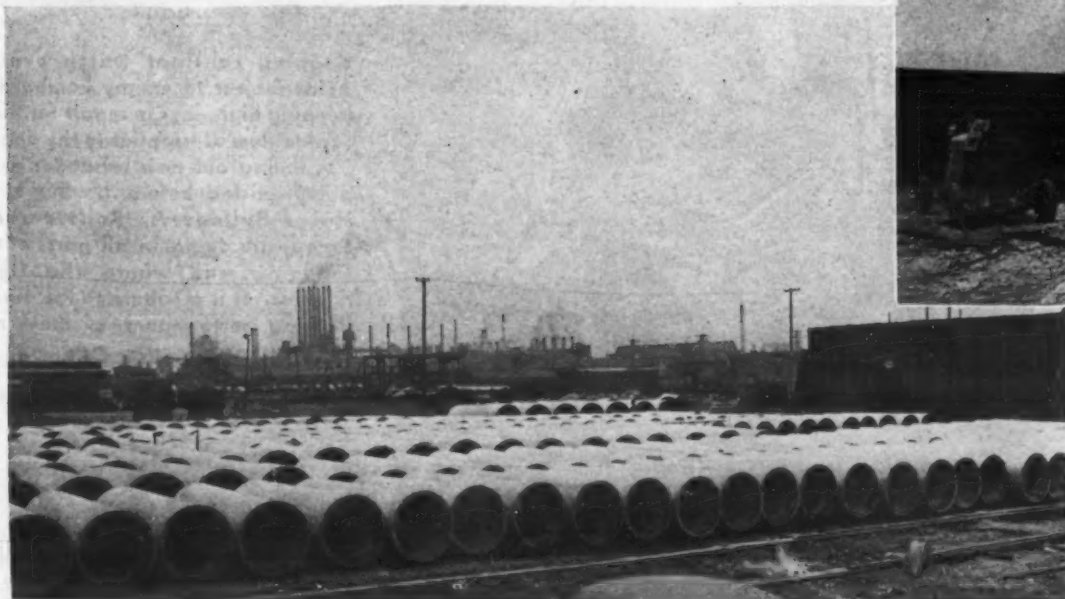


**WATER TOWER.** This 100,000-gallon water tank was constructed at Rantoul, Ill., to provide for a military installation nearby.



**CONCRETE PIPE.** Detroit's principal water problem has been one of distribution, as the largest war plants are located in outlying sections. As many of them use automatic controls operated by water pressure, it is necessary that pressure in all districts be maintained at working use to operate automatic tools. Above, pouring 54-inch concrete pipe for the new Detroit Down River water-supply system and, at left, completed pipe for the Down River line which connects with the present water mains of the City of Detroit to furnish additional water for the locality's war industries.

Off from rock under the  
tion at the Valley Reser-  
Forms for wing wall of  
enter and start of the core  
the main





## Road Organization In Indiana County

(Continued from page 17)

design of bridges and drainage ditches, and may be called upon for advice and surveys for county roads. He may engage in private surveying.

Tippecanoe County has three Commissioners, the elections being staggered so that one Commissioner completes his term each year. These Commissioners appoint the County Road Supervisor for a one-year term. The County Surveyor is elected for two years.

The money for the operation of the County Highway Department comes entirely from the Indiana state gas tax and vehicle-registration fees. The state law requires that \$12,000,000 from these sources be apportioned to the 92 counties of the state. Each county gets a blanket 0.5 per cent, then six-tenths of the balance is distributed according to the ratio of the county roads within each county to the total mileage of county roads within the state. Then, four-tenths of the balance is distributed in the ratio of motor-vehicle registrations in each county to the total registrations in the state.

The new law for the distribution of money to counties was effective only after the first quarter of 1943. In 1941, under the old law, Tippecanoe County received about \$40,000 less than in 1942, when it received \$158,245.35. In 1943 it received \$164,047. The gain is due to an increase in vehicle registration in Tippecanoe County in 1942. Ordinarily Tippecanoe County has spent \$12,000 a year on new equipment in the 8½ years during which the present County Road Supervisor has been in office, and usually two new trucks were purchased annually.

At present the County Highway Department has only twenty-five employees, which includes the eight district patrolmen and the one garage mechanic. Donald McClurg is County Road Supervisor, and Arthur F. Buerkle is County Surveyor.

### County Construction

The county, which has an area of 504 square miles, has a highway system of 850 miles, comprised of 90 miles of black-top, 6 miles of concrete pavement, and 754 miles of gravel roads.

Between 1928 and 1930, when the "3-mile Road Law" was in force and property-owners could petition for 3 miles of new road, specifying the pavement type, the only restriction being that it had to connect with existing pavement, there was a considerable amount of bituminous paving done on the county highway system. Most of this has been taken into the state highway system, leaving only 90 miles of black-top at the present time in the county system.

In 1941 Tippecanoe County did its last black-top surfacing on a stabilized base. The tar stabilization was 6 inches deep, using about 1 gallon of tar per square yard and mixing to a depth of 4½ to 5 inches. On this stabilized base an asphalt mat was laid. Liquid asphalt heated to 240 degrees was applied to the surface and covered with ¼-inch crushed gravel or stone chips. The application of asphalt was originally made at the rate of 0.5 gallon per square yard, but this caused bleeding so it was cut to 0.35 gallon and covered with 30 to 40 pounds of chips per square yard. Because the stone chips have to be shipped 40 miles by freight and because of the difficulty in securing bituminous materials, further work of this type has been discontinued until after the war. The cost of improving roads with the stabilized base and asphalt mat was about \$2,500 per mile.

As mentioned above, it is planned to strengthen the mat for post-war work by

doubling its thickness because of the damage which was done by freezing this past spring. This will double the cost of the improvement per mile of road.

### Road Maintenance

For maintenance purposes, the county highway system is divided into eight dis-

tricts, each with a district patrolman, who has a tractor and a pulled maintainer. One district works out of the County Garage with a power grader. This equipment does regular blading throughout the season when this work is possible and reports daily to the County Road Supervisor. These reports include

damage from flash floods so that the bridge crew and extra labor can be rushed to the site.

A special patching crew, made up of four men with a 2-ton truck, starts out in the spring and works all season on the bituminous and concrete roads. The

(Continued on next page)

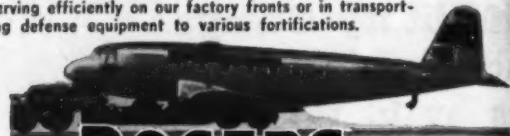


ROGERS BROTHERS  
CORP.  
ALBION, PENNA.

Tanks produce results only in actual combat on the firing line.

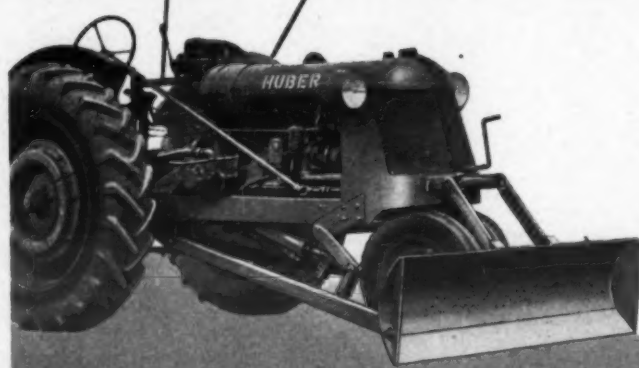
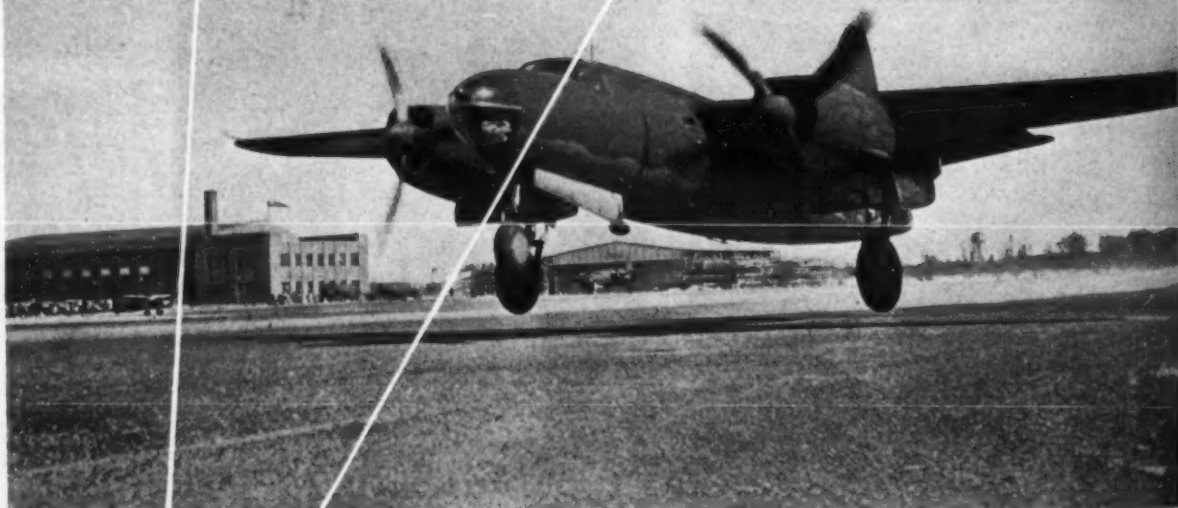
To conserve their fighting capacity they ride to battle on Rogers Trailers, or if damaged are transported to the rear for repairs on a retriever type of trailer especially equipped to load disabled tanks.

Meanwhile, thousands of standard Rogers Trailers are serving efficiently on our factory fronts or in transporting defense equipment to various fortifications.



**ROGERS**  
LOW BED—  
HEAVY DUTY  
**TRAILERS**

Where there's Fighting to be Done  
**HUBERS**  
are in the Thick of it !

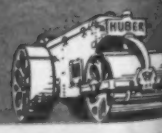


Keeping constant watch over landing fields subject to enemy bombardment . . . keeping highways in repair for the uninterrupted flow of supplies to the fighting front . . . rolling out new roadbeds where they never existed before . . . this is the work Huber Bulldozers, Rollers and Speed-Scoops are doing in all parts of the world today . . . and where the fighting is thickest. It is a tribute to the outstanding, untiring performance of these machines.

THE HUBER MFG. CO., Marion, O.

**HUBER BULLDOZER**

SPEED SCOOPS • ROLLERS







C. &amp; E. M. Photo

Tippecanoe County had plenty of use for its "High Water" signs last spring when the floods washed out a number of county roads and caused considerable damage to road surfaces.

## Tippecanoe County's Wartime Maintenance

(Continued from preceding page)

crew consists of the truck driver, two shovel men, and a raker. A cold plant-mix, made with emulsified asphalt, is used for patching. Known as Precote, it is produced locally at a licensed plant.

Last spring, because of the conditions, it was necessary to clean out many of the holes for patching. This work was so extensive that practically everyone in the County Highway Department was put on patching to catch up with the damage. Normally, the holes are not cut, because they are caught before the breaks reach a serious condition. The edge of the hole is not painted, because the Precote is well saturated with the emulsified asphalt and sticks well, even when the pavement is feathered. The material is not rolled because traffic on the roads compacts it quickly, and it is not sanded because there is a minimum of pick-up by traffic.

The Precote is made with heated stone, although technically it comes under the head of cold-mix paving material. The loads are covered with tarpaulin, and the material stays warm on long hauls. It is easier to work the material while still warm than waiting until it is cold.

The district patrolmen keep the tractors and maintainers for their work in their own barns, and each is furnished with a gas tank by the county. The maintainers used by the patrolmen are standard 7-blade metal drags, the first two blades sloping in from the edges, the second two blades spreading the material toward the outside, the third pair again bringing it toward the center, and then a straight blade across the back to spread the material uniformly.

For ditch maintenance the county has three power graders, which were made necessary by its general ditching program. In the spring of 1943 the ditches were cleaned by cutting with an Adams 12-foot blade pulled by a Caterpillar D7 tractor. The excess material pulled out was loaded onto trucks by a rebuilt Nelson loader and disposed of to strengthen fills in nearby areas.

The county is handling its mowing at present with three Toro mowers and had planned to purchase three more this year, but was unable to because of war restrictions. The three mowers make two rounds per season, but many farmers cooperate with the county and mow their own frontage. With the present equipment it is possible to mow only back to the ditch, leaving the back-slopes untouched.

Winter maintenance is only nominal, as Tippecanoe County is on the borderline of snow, having a real snow problem only about one year in eight. The county owns two V-plows, which are mounted on trucks and used for removing drifts.

A fleet of eight light blade maintainers inherited from the towns when the county took over their roads are used behind trucks for removing snow. They are satisfactory for depths not greater than 6 to 8 inches.

There is not much trouble from ice in Tippecanoe County, and nothing is done to sand the roads on the straightaways, but on the curves sand with a small amount of calcium chloride is used. A few stockpiles are built up during the late summer and autumn at points where icy conditions are likely to occur on grades, and then trucks go out from the county garage in Lafayette, which is near the center of the county, reaching any part of the county quite quickly.

A bridge crew of six men with an Indiana platform truck and two White dump trucks, which are used for hauling washed gravel for concrete, make the complement for bridge maintenance.

### The County Garage and Shop

The county garage is a 60 x 180-foot (Concluded on page 62)

## COLD WEATHER CONCRETE Needs

# SOLVAY CALCIUM CHLORIDE

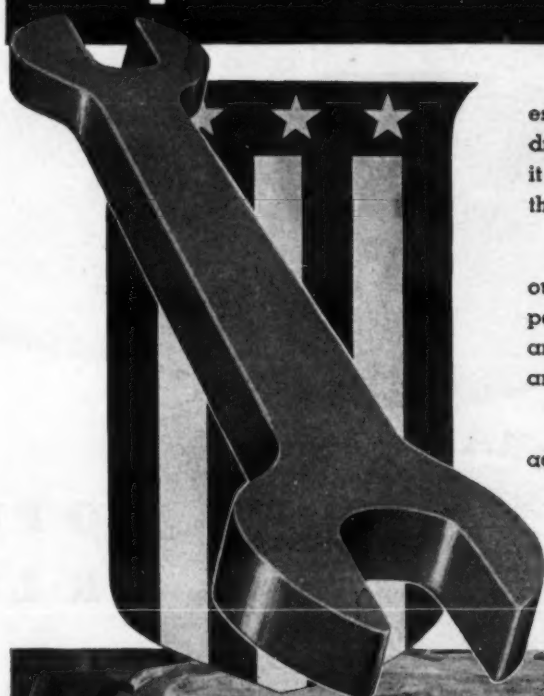
### FOR SPEED, EARLY STRENGTH AND EXTRA PROTECTION

Vital wartime concrete construction work can proceed without delays despite cold weather or sudden temperature drops. Wasteful, costly waits between operations for re-use of forms can be cut . . . the protection period can be reduced. SOLVAY Calcium Chloride added to the mix doubles the strength normally developed during early periods

. . . overcomes slowing effects of low temperatures . . . permits re-use of forms and quicker finishing and use of concrete. It does not change the normal chemical action of portland cements, and makes for a denser, stronger, more waterproof concrete. Write for FREE booklet—"Calcium Chloride and Portland Cement." Address Dept. 94-11.

SOLVAY SALES CORPORATION • 40 Rector Street, New York 6, N.Y.

## Adjust Yourself to Victory



To keep your excavator operating efficiently over the longest possible period, adjustments must be made promptly. A dragging clutch not only wears out its band too soon, but it steals power, and may result in unnecessary stresses throughout the parts functioning in the operating cycle.

Improper adjustments may not show up at once in output figures because a skillful operator can often compensate for them. In the long run, however, repair costs and delays resulting from poor adjustments will cut output and increase costs.

The time required to keep all parts of your excavator adjusted correctly will be more than repaid in decreased power consumption and lower maintenance costs.

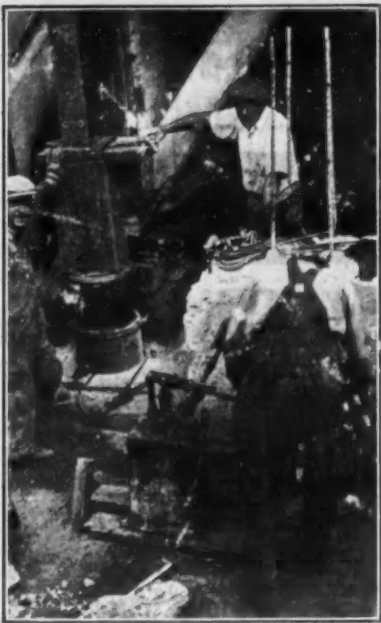
Follow your manufacturer's recommendations for care and maintenance carefully and you will keep your excavator going at top speed for Uncle Sam.



# Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.





C. & E. M. Photo  
One of the 500-ton Watson-Stillman jacks used to lift the side girders in raising Black's Creek Bridge in New Jersey.

## N. J. Bridge Raised On Access-Road Job

(Continued from page 32)

jacks under the adjacent girders, and a 50-ton mechanical jack under the center girder. At the north end five 100-ton Watson-Stillman hydraulic jacks were used, each with a separate hand pump and gage.

Two men worked on the pump at each 200-ton hydraulic jack, taking turns at the pumping. The mechanical jacks were turned up by two men using a Thor air wrench, while one man worked on the blocks and wedges. Each girder was raised about  $\frac{1}{4}$  inch per lift with the mechanical jacks and practically continuously by the larger hydraulic jacks. The actual lift was checked by measurement.

It will be noted that the jacking capacity is several times the weight of the structure being raised. The excess capacity was necessary in breaking the bond between the grouted bridge seats and the girders.

### Personnel

The raising of Black's Creek Bridge was a part of the general contract for the construction of 2.25 miles of dual-lane highway, each 37 feet wide with a center mall 30 feet wide, and the construction of necessary structures and the raising of this one bridge. The general contractor was Union Building & Construction Co., of Passaic, N. J., while the subcontractor on bridges was the Ell-Dorer Contracting Co., of Irvington, N. J., for which A. H. Moore was engineer in charge of the work.

The contract for the Fort Dix access highway was awarded by the New Jersey State Highway Department, C. F. Bedwell, Acting State Highway Engineer, and Morris Goodkind, Bridge Engineer.

### Air Trip for Buckets Used at Concrete Dam

More than 2,800,000 cubic yards of concrete is required for the construction of the new TVA Fontana Dam on the Little Tennessee River in North Carolina. This means 700,000 bucket-loads of concrete to be shuttled out by concrete trains, picked up and swung into the forms by gantry cranes, and dumped.

To speed the concrete dumping process, each of the 4-cubic yard concrete buckets used on this project has been equipped with a compressed-air-operated

trip which the Compressed Air Institute estimates has saved much time, manpower and expense. To trip one of these buckets, a workman simply rams the nozzle of a compressed air line into a small socket at the base of the bucket, turns on the air, and the bucket is empty in less than two seconds.

Other uses for compressed air at Fontana Dam include the operation of jackhammers, rock drills, sinkers, and hoists, as well as grinders and other tools in the maintenance and repair shops.

### Du Pont Appointment

Charles B. McCoy, formerly Director of Chemical and Miscellaneous Sales of the Explosives Department of E. I. du Pont de Nemours & Co., Wilmington, Del., has been appointed Director of Sales of the Explosives Division. Mr. McCoy has been connected with the du Pont company since 1928, and succeeds Samuel G. Baker, who has been made Director of the company's Electroplating Division.

## CONNERY'S HEATING KETTLES



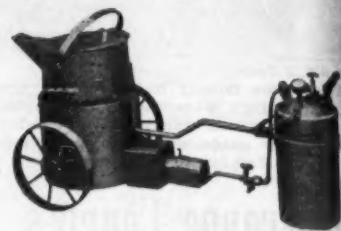
Speed up work by using a Connery Heating Kettle for building and maintaining highways, airports, barracks and roads. Made in sizes of 30, 80, 110 and 165 gallons.

Send today for our complete catalog showing our full line of Tar and Asphalt Heating Kettles, Spraying Attachments, Pouring Pots, etc.

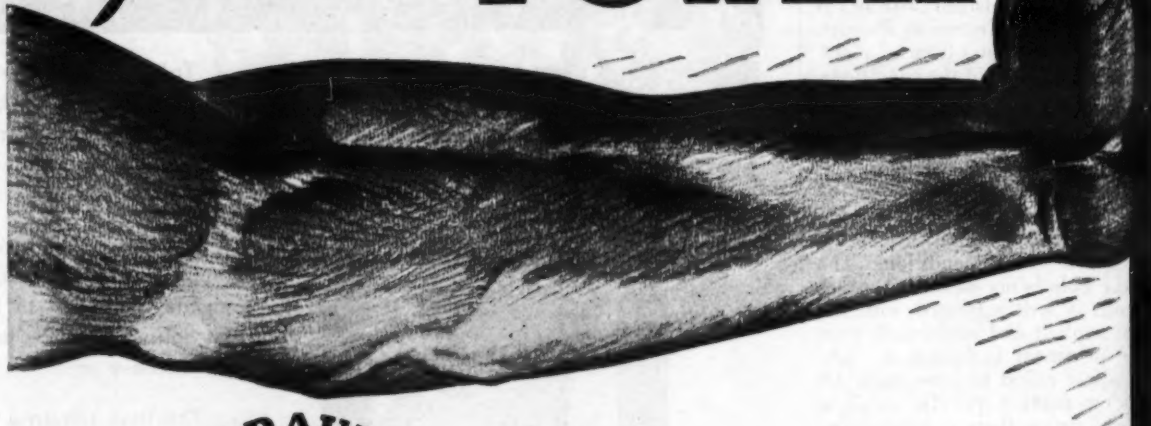
**CONNERY  
CONSTRUCTION CO.**

4000 N. Second St.

Philadelphia, Pa.

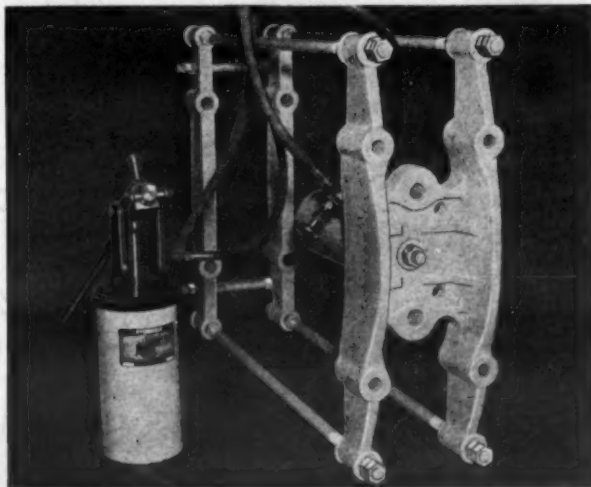


## Hydraulic POWER



**TO PUSH, PULL  
OR LIFT . . . . .**

Manufacturers of: Universal Hydraulic Presses - Track Press Equipment  
Hydraulic Keel Benders - Hydrostatic Test Units - Power Track Wrenches  
Hydraulic Plastic Presses - Portable Straightener for Pipe and Kellys



Rodgers Universal Hydraulic Presses provide 100% press service for contractors having heavy machinery to repair on the job or in the shop. The Universal Press is portable and can be carried to the job and assembled around the work.

The Universal Press may be used in any position or may be dismantled and reassembled about a gear to be pulled, a frame straightened, or similar work which cannot be readily brought to the press. The Rodgers Universal Hydraulic Press is designed for doing a better job, and saving many hours and days of valuable time. *If it's a Rodgers, it's the best in Hydraulics.* Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minnesota.

**Rodgers HYDRAULIC Inc.**





A Caterpillar-diesel-powered Buckeye ditcher digging trench for 24-inch pipe for War Emergency Pipelines, Inc., in Pennsylvania.

### Electric Hand Saw Has Many Job Uses

The preparation of forms for concrete, the increasing amount of timber construction because of the curtailment in the use of steel, and the many odd woodworking jobs to be done in contractors' and state and county highway department shops call for the frequent use of a portable hand saw. The new Wappat portable electric hand saw, designed for such service, can also be converted easily into a radial saw unit through the use of the new Wappat radial saw guide.

The Wappat saw, available in two models, has compact streamlined construction, powerful but cool-running motors operating on ac or dc, automatic safety switches, and the Fred W. Wappat spring operated telescoping safety guards for complete protection without interfering with the operation of the saw. Both models are light in weight, Model A-8, with an 8-inch blade, weighing 19 pounds and Model A-9, with a 10 1/2-inch blade, weighing 22 pounds. The former cuts 2 5/8 inches on a square cut, and 2 3/16 inches at a 45-degree angle. One clamping lever provides simple depth adjustment from 3/16 inch to 1 1/2 inches. The larger model cuts 3 7/16 inches on a square cut, 2 13/16 inches at a 45-degree angle, and adjusts from 1 to 2 7/16 inches in depth. Clearly marked graduations on the quadrants permit quick accurate adjustment to bevel cutting.

To convert this hand saw into a radial

unit, a new radial saw guide is available. Either hand-saw model may be set in this guide and attached to the bronze

slider and shoe in less than two minutes, the manufacturer reports, and may be removed for use as a hand saw in the same amount of time. The guide may be firmly and accurately locked for square cuts or for any angular cuts desired. A light convenient saw table which may easily be moved about the job or shop is also available.

Further information on these hand saws and accessories may be secured by interested contractors and state and county highway engineers direct from Fred W. Wappat, 149 Valley St., Mayville on Chautauqua Lake, N.Y. Just mention this item.

### U. S. Army Engineers Build New Burma Road

U. S. Army Engineers are cutting a new Burma Road through jungles in the shadow of the Himalayas and heading for country now held by the Japs, according to a recent dispatch from Walter L. Briggs, United Press Staff Correspondent at a U. S. Army Base in north-

eastern India. Although intensive work on the road, which may prove the answer to the problem of supplying the Chinese for the coming battles against Japan, began on December 15, 1941, for security reasons no announcement about the work has been allowed until recently.

The new road was started before the Japanese closed the old Burma Road with their drive on Lashio. Eventually the builders of this new road may face Japanese troops occupying regions of Burma and China, but for the present the main perils are the elements and the terrain, offering what some officials describe as worse than any difficulties ever faced by Panama workers. The toughest foe of all, Mr. Briggs' dispatch states, is the rain which drenches the countryside each summer with 200 to 300 inches of water, turning the fresh road cuts into knee-deep rivers of mud.

Guarding the road are units of the Chinese army which withdrew from Burma to India last year and have been training since with the most modern equipment under U. S. instructors.



### NO JOB TOO BIG FOR MARION

Undermining the Axis is all in a day's work for MARIONS. They are doing this at home by supplying war factories with plenty of raw materials they need to establish unprecedented records of production—and abroad by building and rebuilding the necessary roads and airports to keep our fighting forces pressing ever onward to Victory. They are doing both jobs in a way to inspire increased confidence in MARION machines for the future.

MARION STEAM SHOVEL COMPANY  
MARION, OHIO, U. S. A.

## MARION

SHOVELS • DRAGLINES • CLAMSHELLS  
CRANES • PORTAL CRANES • WALKERS



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Order Now!  
QUICK SERVICE  
NO PRIORITIES  
NEEDED

Speed construction. Protect vital materials in all sorts of weather. FULTON TARPULINS will give you maximum satisfaction. Contractors Supply Dealers in every state sell the FULTON line. Specify SHUREDRY and FULTEX. FULTON products are good and prices are right. If your dealer can't supply you, write our nearest plant for catalog, samples and prices.

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Manufacturers Since 1870  
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NEW YORK NEW ORLEANS KANSAS CITY, KAN.



## Assembling Trusses For Timber Bridge

(Continued from page 31)

It was originally planned to fabricate half-truss sections on the ice and raise them into place, but the erection crane was not heavy enough for this job. It was then decided to fabricate quarter sections, and an extra counterbalance of 330 pounds was added to the crane. The quarter sections were fabricated on skids on the river ice and then pulled within reach of the crane which raised and swung them into position on the falsework. One quarter section was estimated to weigh 9 tons.

The first section was swung into place and left resting on the falsework while the next section was hoisted, fitted into place, and held by the crane until the splice blocks of the top and bottom chord were simultaneously bolted and drawn up. The diagonal member was then bolted to the vertical member. Warped members and other defects caused some trouble in bolting the diagonals. Seats for the ring connectors did not always coincide. Jacks, turnbuckles, and hoists were used in matching the members. The pony-bent falsework was built low enough to allow the use of wedges in adjusting the sections for camber.

An end section of each truss was placed first and the other sections added successively and guyed in place. The adjoining truss was then erected, the top and bottom laterals being placed as soon as possible to give stability. The four trusses for each span were erected in full, working downstream from the upstream truss, with the exception of the span between piers Nos. 1 and 2. Four clamps were made to facilitate bolting the large splices in the bottom and top chords. Each clamp consisted of two white-oak blocks 6 x 6 inches x 3 feet, drilled at each end for a 1½-inch bolt 5 feet long. These blocks were clamped around the splice at the joints and drawn up tight so as to permit starting the nuts on the splice bolts.

The span over the main flow of the stream, between piers 1 and 2, was chosen for first erection in order to get the equipment off the ice before the spring break-up. Work was started on March 17, with two 11-hour shifts, one gang fabricating the truss sections at night and the other erecting them during the day.

During the first part of March the temperature was below zero, but when erection began the weather became considerably milder, the temperature reaching 40 degrees above at midday. During the erection of the middle span, the crane boom was fouled with a guy line, which caused damage delaying progress for 2½ days. The last quarter section of this span was raised into place on March 30 and the wedges and falsework removed the following day.

The erection of the span between piers 3 and 4 moved more smoothly, taking only 7 days, and was completed on April 6, while the span between piers 1 and 2 was completed on April 13. A special procedure was used in erecting this span which passed over and reduced the clearance on the temporary river crossing. Three sections of each span were first erected so as to leave the roadway under the fourth section unrestricted as long as possible.

At three o'clock on the afternoon of April 11, the water in the river showed signs of rising, and the ice was quickly cleared of skids and materials. By five o'clock water was running a foot deep over the ice.

### The Decking

Native spruce for flooring the approaches was supplied from the Muskwa Mill at Army Mile 256. This consisted

of 2 x 6-inch flooring in 26-foot lengths, with some 14 and 16-foot lengths. Tapered pieces were sawed for the curved approach from the south. The truss spans were floored with 3 x 6-inch creosoted fir in 10 and 16-foot lengths shipped from Oregon.

Native-timber decking was dipped in

a water-borne salt preservative at the site. It was desired to obtain a retention of ¼ pound of preservative per cubic foot of timber, but tests made two weeks after dipping showed disappointing results, as the fluoride salt had penetrated only ⅛ inch. A supplementary treatment was applied with a mop just

before the flooring was laid.

The laying of the floor beams, stringers, and treated decking and the erection of the rail posts on the trusses were started April 12, working from the west approach. A 22-ton crane was used in swinging the floor beams and stringers into

(Concluded on next page)



## MARTIN TRAILER

—4 models—  
7, 10, 15 & 20-ton  
capacities

Don't say, "We want a TRAILER." Say: "We want a MARTIN Trailer."—This will insure your getting a trailer that's EASY LOADING, POWERFUL, FAST, SAFE, LONG-WEARING and ECONOMICAL. . . .

Sold by all Caterpillar Distributors.

WRITE FOR BOOKLET

## Martin Machine Company, Kewanee, Ill.



Enlarged reproduction free on request

## Thanks to America's Engineers

When certain pirates started picking off what they wanted in China, Africa, Europe and the Pacific—before coming at us—they figured that the U.S.A. couldn't do much about it. We didn't have enough ships to handle even 30% of our peacetime ocean traffic! How could we interfere!

But in twenty months, thanks to your help, America has broken all shipbuilding records. Fighting production workers in mines, mills, forests . . . in factories producing essential parts . . . in oil fields . . .

and shipyards . . . have combined to accomplish the "impossible."

Continued success now depends on maintaining record-breaking production. The results are beginning to interfere with Adolph-Tojo plans. But America must not slacken its pace in producing the materials that go into the building and the operating of our Merchant Marine—the metals, timber, coal and oil, the marine equipment, and cargo for the ships.

Now it is up to all Americans to finish the job . . . and fast.

### You Have Helped Us Do Our Part

We thank you, loyal customer, for conserving Wickwire Rope so that more can go to the Liberty Ships. But when you need new wire rope to maintain war production, tough, long-lived Wickwire Rope will always be available on priority, to the best of our ability.

Wickwire Spencer was first in New England to be awarded the Maritime M and Victory Fleet Flags for excellence in production of rigging for the U. S. Merchant Marine. A Gold Star has been added for maintaining that record.



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## WICKWIRE ROPE

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### Quantities and Personnel

The quantities involved in this contract for the Sikanni Chief River Bridge on the Alaska Highway were:

Structural excavation	100 cu. yds.
Treated piling	6,535 lin. ft.
(water-borne salt preservative)	491,824 lbm.
Crested fir timber	14,180 fbm.
Treated spruce timber	15,618 fbm.
(water-borne salt preservative)	25,040 fbm.
Untreated fir timber	12,000 lbs.
Untreated spruce timber	76,660 lbs.
Hardware	
Substructure and approaches	
Superstructure	

The contract for the entire job of constructing the Sikanni Chief River Bridge was awarded to Pederson Brothers, Inc., of Montevideo, Minn. The author was Resident Engineer on the project for the Public Roads Administration whose engineers designed the structure.

### New Novo Service Manager

Donald M. Houghtaling, former Assistant Service Manager of the Novo Engine Co., Lansing, Mich., has been

appointed to succeed the late Joyce Humphrey as Manager of the Service Department. Mr. Houghtaling, who has been associated with Novo for nine years in all capacities of service operation, re-

cently compiled the "Technical Pump Manual" for the U. S. Engineer Corps and plans to extend this type of manual through the entire Novo line of contractors' equipment.



Public Roads Administration Photo  
Assembling treated-timber trusses for the Sikanni Chief River Bridge on ice. The temporary Army-built crossing is seen in the background.

## All-Timber Bridge On Alaska Highway

(Continued from preceding page)

place and as the decking advanced all laterals and sway braces that had been left out were hoisted and bolted into place. The work was carried on in two shifts, the day crew doing most of the bracing while the night crew placed the stringers and spiked the laminated decking in place, averaging about 30 feet per 11-hour shift. The running plank was nailed in place as the deck advanced. A fire wall was built at pier 3 when the decking reached that point, and another was placed at pier 4, causing some delay in the progress on the decking. Two other fire walls on the approaches were erected in advance of decking operations.

On the night of April 19 the last of the decking was spiked in place and the running plank laid. April 20 and 21 were spent lining up wheel guards and rail posts, leaving only the painting and cleaning up of the site to be done. By April 25, the day of the official opening, the bridge was complete, except for the last finish coat of white paint on the hand-rails and wheel guards. The actual time used in constructing the superstructure was 32 days, and the total time from the driving of the first pile to final completion was 23 weeks.

## AMERICAN WHEELBARROWS

With Steel Wheel  
for WAR ORDERS

Barrow shown is the American No. 1—4 cu. ft. struck capacity DeLuxe Concrete Wheelbarrow available with steel wheel.

Code with steel wheel.....  
.....PERFECT-S



Write  
for  
Bulletin

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

12 ton crane; or 10 ton crane fully convertible to 1/2 yard shovel, trench hoe or dragline—"ready for the road"—and the next job. ALL MICHIGANS have fingertip AIR CONTROLS.

When the desirable jobs "break", be prepared to secure your full share. The time to consider new equipment for handling these projects is NOW.

When it comes to mobile Shovels and Cranes, the veteran air-controlled MICHIGANS stand out in front with their high mobility plus rugged stamina, convertibility plus ease of operation.

There's vast CONSTRUCTION AHEAD—Watch for the signs—and be ready with MICHIGANS.

GET THE FACTS NOW—

Write, wire or phone for Bulletin CE-113.

AIR CONTROLLED  
**MICHIGAN**  
POWER SHOVEL CO.

BENTON HARBOR, MICHIGAN

## MARVEL-KOTE MEMBRANE CURING COMPOUND FOR ALL CONCRETE SURFACES

Meets Federal and State Specifications

ALSO

ASPHALT ROOF COATINGS  
ROOF AND METAL PAINTS  
CAULKING COMPOUND  
PLASTER BOND  
RUST PREVENTIVE  
OTHER WATER-PROOFING  
SPECIALTIES

CONCRETE CHEMICAL CO.  
310 Railway Exchange Bldg.  
Kansas City, Mo.



## Special Vehicle Care Extends Service Life

(Continued from page 13)

All items which are in perfect condition are marked with a check mark, items marked with a cross show that adjustments have been made, and items marked with an "O", show that repairs are needed. At the bottom of the 8½ x 11 card is ample space for remarks and the location of the garage and name of the mechanic. The final item is a cost summary divided into labor and material.

### Making Tires Roll Farther

On January 14, 1942, a special 4-page mimeographed bulletin on Tire Conservation was issued to all garages. The introductory paragraph reads, "The limited stock of rubber in this country and the demands on this stock required for strictly war needs has necessitated a rigid rationing of this material. This Bulletin is designed to bring to your attention some fundamental rules for the care of tires. Probably no other single item of equipment maintenance cost will react more favorably to preventive operations and to proper servicing procedure than tire costs. It has been definitely established that improper inflation, overloading, bad wheel alignment, etc., can reduce tire life as much as 50 per cent."

On March 10, 1942, a bulletin on Truck Loading and Tire Inflation Pressures was issued, comprising three pages of mimeographed material with a tire-inflation pressure chart. The tire inflations used were taken from the charts issued by one of the well-known tire companies. Each Division was required to make a tire-inflation chart for each piece of equipment in its Division and to post it at each air pump.

A factor in tire inflation which is not taken sufficiently into consideration is that in summer the pressure of the front tires need not be as high as the rear tires, but in winter when snow plows are attached to the front of the truck the pressure in the front tires must be increased as much as 25 pounds. For example: the tire-inflation chart shows, for a Chevrolet 1934 truck owned by the Department, a pressure of 45 pounds for the front tires, which are 32 x 6, 8-ply. The rear tires of the same size have a recommended pressure of 75 pounds. Under "Remarks" an item appears "Front tires, 75-pounds pressure when truck equipped with snow plow". On another truck with the same size but 10-ply tires, the front-tire pressure is 55 pounds and the rear 80 pounds, but when equipped with snow plow both front and rear tires carry 80-pounds pressure.

Each Division garage is equipped with a master tire gage which is used to check all other gages. The man responsible for the standard tire gage at the Central Garage in Columbus had his gage on a chain and with a heavy piece of soft hose wired around it to protect it. When his gage was checked by the master gage it was 100 per cent accurate. In order to reduce tire wear further, each Division

is equipped with a wheel-alignment machine.

The Motor Transport Division has had considerable experience with recapped tires. Prior to the present emergency the tires from one passenger car were removed after 28,000 miles of operation and recapped. At 56,000 miles the re-

cap had worn smooth and as the winter season of bad driving was approaching the tires were removed to be replaced on a car the following spring. This extended service with a recap was due to the high class "camelback" then available. Tires recapped with the present lower grade of camelback do not wear

anywhere nearly as long. A total of 5,000 miles on a recap is now considered very good.

All rubber-tired equipment which is stored in the open for periods of a month or longer is stripped of the rubber tires which are placed in a dark cool ware-

(Concluded on next page)

## WHAT PRICE TRAILER QUALITY?

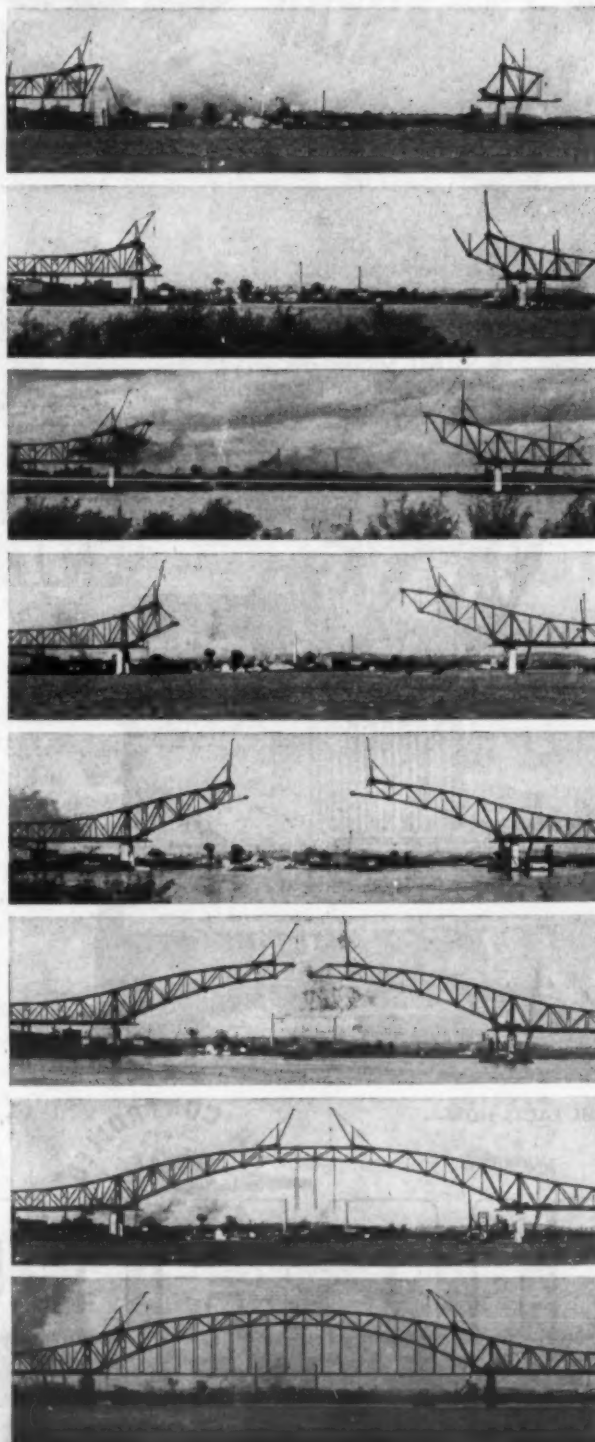
You're going to buy a trailer! What kind of a trailer? A trailer at a price—without any reserve factor of safety? One that is going to give frame or axle trouble after only a few months' operation? . . . Or will you come to trailer headquarters and buy a trailer engineered for the job—a Jahn trailer! Get down to details and find out what you are buying. Jahn trailers have oversize beams. Brake cross shafts and radius rods have bronze bushings. Wheels are mounted on oversize roller bearings. Ample cross members and gusset plates give strength to resist twisting strains. Goosenecks on each trailer are individually designed and constructed to meet required strength. Mechanical brakes, loading ramps, lash rings, safety chains, reflectors and flag sockets are standard equipment. There are no extras. These are only a few of the things that are standard on Jahn trailers. It costs nothing to ask, and we can help you.

C. R. JAHN COMPANY

1347 W. 37th Place, Chicago 9, Ill.



## Continuous-truss, tied-arch bridge over Mississippi at Dubuque



Across the Mississippi River at Dubuque, Iowa, Bethlehem recently completed erection of the second continuous-truss, tied-arch bridge in the United States. This bridge, 5760 ft. in length, including elevated approaches, required 7420 tons of steel. It consists of a three-span continuous-truss unit with 347-ft. side spans and an 845-ft. central arch.

An unusual method of handling expansion is employed. Rocker columns 8 ft. long are used at the end piers, and at both ends of the arch the usual expansion shoes riding on nested rollers are provided under each truss. Also, at the east end of the arch a large pin embedded at the center of the pier extends upward into the floor-beam to carry the longitudinal wind-load without producing torque in the pier.

To save as much falsework steel as possible, the middle span was built as a cantilever, by the straight and balanced methods. And when the trusses had been joined at the middle of the arch, the hangers, floor system, and bottom chord ties were added, converting the middle span into a tied arch.

On the west side, where much of the side span was over land, Bethlehem used falsework bents and proceeded by straight cantilever to the center of the arch. But on the east side, where the side span was over deep water, the need for falsework and pile foundations was avoided by shifting to balanced cantilever, erecting the steel simultaneously in opposite directions from the east main pier.

Detailed accounts of the design and erection of the Dubuque bridge appeared in the February 25, 1943, issue of Engineering News-Record, and in the March Construction Methods.

Engineers: Howard, Needles, Tammen & Bergendoff



BUY MORE  
WAR BONDS

**Carey Elastite**  
EXPANSION JOINT  
Standard in Concrete Construction for 31 Years  
ECONOMICAL and EFFICIENT  
Asphalt Joint  
Fiber Joint  
Sub-Grade Felt  
THE PHILIP CAREY MFG. CO.  
Dependable Products Since 1873  
LOCKLAND, CINCINNATI, OHIO



## Ohio Sets Up System For Equipment Care

(Continued from preceding page)

house. The State Highway Department has a Field Tire Engineer who travels over the entire state inspecting tires on all state-owned motor vehicles and equipment. He has saved his salary and cost of gas and the wear and tear on his passenger car many times over through the saving of Department tires through this work. He has recommended the shifting of the tires from one wheel to another to equalize wear. This is now standard practice in the Department as soon as tires begin to show uneven tread wear. As a result of careful planning and the application of tire-conservation measures, no state-owned vehicle has been grounded for lack of tires.

### Truck Loads

The Bulletin of March 10, 1942, on Truck Loading and Tire Inflation Pressures was the result of very careful study and preparation. Actually three bulletins were prepared: one by the best automotive engineer in the Department, one by the best practical garage superintendent, and one by the Chief of the Motor Transport Division. The first was somewhat too technical for distribution, the second was very practical but not sufficiently technical, while the third approached the entire problem from the administrative standpoint. Parts of each of these preliminary bulletins were taken to prepare the Bulletin finally issued. This Bulletin gives the theory of how to load a truck and then the Division garage superintendents were required to load their trucks and put them on scales, one pair of axles at a time, to determine the proper trimming of the load for the specified tire inflations. In addition, materials were weighed up, such as cinders, gravel and stone, and a trim line painted on the inside of the truck to show the proper limit for the load which would not overload the tires when properly inflated.

By restricting the loads to the tire carrying capacity, much life is added to the truck as well as to the tires. The Office of Defense Transportation allows a 20 per cent overload, but Ohio sticks to the capacity of the tires with no overload. Each truck carries a sticker, usually on the inside of the windshield, which shows the payload capacity of the truck in pounds.

Another factor in loading was the change from 1½ to 2-ton bodies for trucks used in the Highway Department, not for the extra load those bodies made possible but for the added body width which made it easier to load and haul certain concrete mixers, tar kettles and mowers.

### Motor Vehicle Speeds

All trucks are governed for a maximum speed of 35 miles per hour. This caused trouble with some of the truck drivers who had the idea that governing robs the trucks of power in low gear. They felt that low speed meant low power, but demonstrations proved to them that the trucks still had plenty of

power in low gear.

Some trouble was experienced with governors as certain ones would not operate well on certain makes of trucks. When this difficulty was straightened out, pamphlets were secured discussing this whole problem and placed in the hands of all Division garage superintendents. These pamphlets have been a great help in preventing the placing of the wrong governor on a truck, with its many attendant difficulties in truck operation. The governors have saved much engine, as well as truck, overhaul.

A maximum speed of 40 miles per hour was established in January, 1942, as a practical economic speed for operating Department of Highways automobiles. Governors have been installed on all passenger cars and are set to cut out at 50 miles per hour, the speed range between 40 and 50 miles being considered a safety range to be used only in emergencies. In October, 1942, the maximum permissible speed was reduced to 35 miles an hour to conform to Government regulations.

### Other Equipment

Snow-plow service is probably the most damaging to which motor trucks are subjected. The side thrust on the front bearings in particular and on the frame causes excessive wear. For this reason, the state specifications have been changed to require heavier front-wheel bearings for trucks to be used in snow-plow service. This applies to all dump trucks.

The entire section of Ohio north of an east and west line through Columbus is the severe snow and ice belt of the state. Each Division garage in this belt is equipped with a portable generator set, with voltage control, to charge batteries in about 30 minutes. This is used especially on snow-plow trucks which are called upon to operate long hours in low gear with a very large drain on their batteries from the head lights, spot lights and warning lights which they must carry to protect themselves and highway traffic.

Recently, when the Department need-

ed a machine to break up concrete pavements, one was assembled in quick time from various parts of the state. The hoist came from the shops at Ravenna, an old truck was secured from the Marietta District and put into shape for the work. The truck and hoist were sent to the shops at Sidney, where the outfit was assembled and double-reduction gears put on the truck for very slow speeds. The hammer was cast and the leads made at the Sidney shops. The truck is operated at a controlled slow speed, delivering a heavy blow to the pavement every 3 feet. This spacing makes it easily possible for standard power shovels to pick up the broken concrete.

### Personnel

The Motor Transport Division of the Ohio Department of Highways is operated under the supervision of Harry D. Metcalf, Chief Engineer of Maintenance, with Clyde C. Hadden as Chief of the Division. H. G. Sours is Director of the Ohio Department of Highways.

## Asphalts and Tars

QUICKEST HEATING  
Speediest Transfer to Distributor

### BROS CIRCULATOR

A CIRCULATING  
TANK CAR HEATER

Designed for maximum efficiency, low operating costs and long life

The Bros Circulator is engineered with extra margins of performance and durability. It has an unusual record of trouble-free service.

The Bros Circulator starts asphalts and tars at 20° above their solidifying point. It raises the temperature of a car 50° F. per hour after circulation is started—and transfers the heated materials to the distributor at the rate of 325 gallons per minute. Steam is seldom, if ever required, as average SC7 can be started at 60° F. Oil is taken in at the coldest spot on the circulator and discharged at the hottest spot so there's no danger of scorching, burning or cracking the asphalt. That's its operating record.

Its design assures maximum economy and efficiency. The Oil Burner is non-clogging and air-atomizing with positive flame control. There is no carbon to remove

from the heating element—a feature that saves time and money—and the heating element contains no dangerous gas pockets to cause explosion.

A silent chain drive, running in oil, operates transfer pump, providing noiseless, trouble-free performance. Four pumping speeds are provided for maximum efficiency. Shear pin protection for pump and drive shaft. Ford Motor Power Unit.

With its light weight and low center of gravity, the Bros Circulator permits Semi-Trailer mounting so essential for fast, safe driving. Complete details will be sent on request.

ROAD MACHINERY DIVISION

WM. BROS BOILER & MFG. CO.

Minneapolis, Minnesota

## VULCAN TOOLS

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.

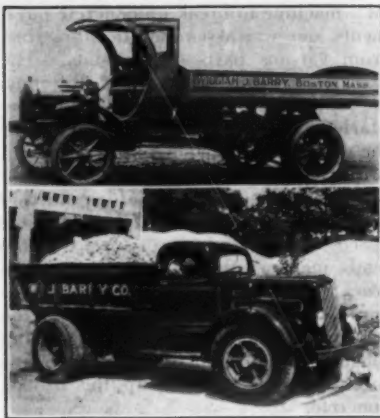
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## BROS CIRCULATOR







Then and now. Top photo, the first automotive dump truck put into service in New England, in 1912, and, bottom photo, one of the more modern White trucks now in use by the William J. Barry Co. of Boston.

### Dump-Truck Progress Exemplified by Barry Co.

Twentieth-century progress is allied in no small measure with the development of motor transportation. Among those who have written a chapter on dump-truck development is William J. Barry of Boston, Mass., head of a leading New England quarry company which was founded by Mr. Barry in 1900.

When Barry started business, all hauling of stone was done by horse-drawn dump trucks, and continued so for over a decade. In 1912, while supplying stone for the construction of an addition to the old Boston subway, the first to be operated in the United States, Barry purchased the first motor dump truck to be used in New England. This vehicle was used as a trial unit for a basis of comparison with horse-drawn carts. The truck, a White unit, proved so successful in its competition with the horse-drawn vehicles that Barry purchased seven more and put them into service on the subway project. It is interesting to note that the first truck purchased continued in service until 1937, and another unit bought in 1914 continued in constant operation until 1942, having traveled more than 350,000 miles.

The William J. Barry Co. hauled most of the crushed stone used in building the Boston subway system and in constructing the U. S. Army Base at South Boston in 1917, at that time the largest base to be constructed by the government. A total of 1,500,000 tons of stone have been

hauled in Barry-owned White trucks since their first use by the company, and today are delivering stone to vital road and war construction projects in the Boston area.

### New Road Dummy Strip Made of Mastic Board

A new type of strip for highway dummy joints which is made of mastic board has recently been announced by Keystone Asphalt Products Co., 43 E. Ohio St., Chicago, Ill. This dummy strip which is  $\frac{1}{8}$  inch thick has a high degree of rigidity and meets all Federal and state specifications, the manufacturer states. The strip is furnished in full-size sheets scored to the required widths, which are generally 2,  $2\frac{1}{4}$  or  $2\frac{1}{2}$  inches. The sheets are easily taken to the job, and the strips taken off in the same manner as you break off a square of chocolate from a candy bar. Another feature of this dummy strip is that it is a homogeneous product, and

completely waterproof.

Further information on this new Keystone mastic-board dummy strip, more than 1,000,000 linear feet of which has

been used by one contractor on two airport projects, may be secured by those interested direct from the manufacturer. Just mention this item.

### HOBART Arc Welding keeps the job moving...

• "SIMPLIFIED" REMOTE CONTROL, an exclusive Hobart feature, lets you control heat right at your work—a real help on all construction work where operator is at a distance from welder. This is just one of the many Hobart exclusive features which makes it the most efficient welder available today.

• DESIGN PROBLEMS can be solved through the help of these sheets. Initial pages FREE. Write for them today.

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Box CE-113, TROY, OHIO

**HOBART "Simplified" ARC WELDERS**

"One of the World's Largest Builders of Arc Welders"



— can be increased with a



**WELDED  
DIPPER**

Shovel engineers solve the problem of increasing speed and daily output of power shovels by using fast moving PMCO Welded Dippers. Welded fabrication eliminates bur-

densome weight and under almost every condition a larger size PMCO Welded Dipper can be used without increasing the power or mechanical structural parts of the shovel.

We operate the largest and most complete manganese steel foundry in the United States.

**PETTIBONE MULLIKEN CORPORATION**

Established 1880

4710 West Division Street, Chicago 51, Illinois

### First Choice BURCH TRUCK PATROL



A BURCH TRUCK PATROL is first choice when a machine is wanted to clear slush and ice from paved roads, work shoulders, clean shallow drainage ditches and many other jobs that no other machine of its class can do. HYDRO-MOTOR CONTROLLED.

Manufactured by  
**THE BURCH CORPORATION**  
Crestline, O.

Equipment since 1875

★ Buy Bonds ★



### Salt Water Keeps Work Going at New Air Base

The recent award of an Army-Navy "E" to the contractors for the Mountain Home, Idaho, Air Base for completing the job ahead of schedule disclosed an unusual feature of the construction, according to a recent issue of *Army News*. In order to keep work going on the mammoth runways during last winter, the contractors built their own brine plant on the job to dissolve salt in the water used for grading and surfacing operations. The use of 1,840 pounds of salt on each 1,000 gallons of water prevented the freezing. Altogether 59,950,000 gal-

lons of water was used on the project. Like all other military construction, the Mountain Home Air Base was supervised by the Corps of Engineers, and is one of the nearly 700 air bases in the United States on which Engineer construction was undertaken during the past fiscal year.

### Sale of Shunk Mfg. Co.

Announcement has been made by John Q. Shunk, General Manager of the Shunk Mfg. Co., Bucyrus, Ohio, of the sale of the entire business to an independent partnership made up of Eleanor F. Boers, Helen L. Morgan, Fred E. Mor-

gan, Anna H. Lilley, Robert A. Boers, and Arno W. McGraw.

Mr. Shunk, whose father founded the firm in 1854 for the manufacture of grader blades, snow plows and similar equipment, will remain with the company as General Manager for the present. Gale Fegley, Sales Manager, will also remain as Purchasing Agent, and Mr. McGraw has been made Treasurer.

### Research Board Meeting

The Twenty-Third Annual Meeting of the Highway Research Board will be held at the Edgewater Beach Hotel, Chicago, Ill., from November 27

through 30. The first two days, November 27 and 28, will be devoted to meetings of the various committees and departments. Sessions of the Board for the presentation and discussion of papers relating to highway finance, economics, design, materials, construction, maintenance, traffic and soils investigations will be held on Monday and Tuesday, November 29 and 30.

According to Roy W. Crum, Director of the Board, it is expected that time and travel facilities will be greatly conserved by holding this meeting contiguous to that of the American Association of State Highway Officials who will meet immediately after at the same hotel.

# Around the World!

## BLAW-KNOX Construction Equipment

*Is making good on the World's Toughest Proving Grounds*



Shipment of Blaw-Knox Finishing Machines for Airbase Paving Construction.



Get to know your Blaw-Knox distributor—he can help you with your equipment needs and maintenance.

**Another trainload of Blaw-Knox Construction Equipment** starts its long journey—destined for construction battalions overseas. Blaw-Knox Equipment is making good in every theatre of our global war—helping to build for an earlier victory.

**BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY**

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NEW YORK

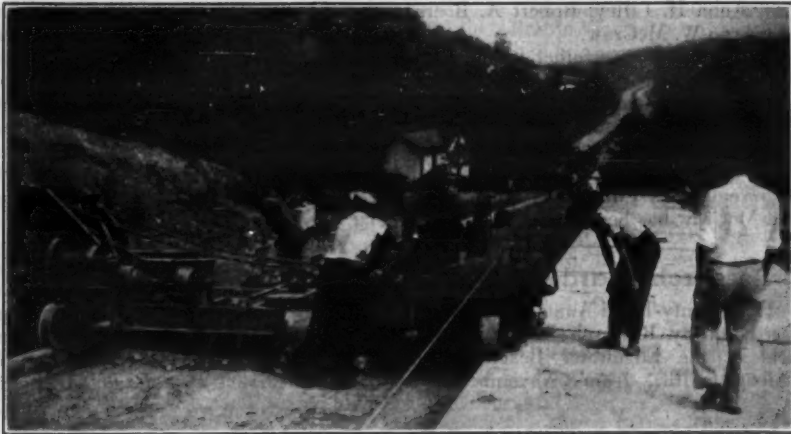
CHICAGO

PHILADELPHIA

BIRMINGHAM

WASHINGTON





C. &amp; E. M. Photo

The H-B Finegrader working on the subgrade of the second lane of the McKnight Road project in Allegheny County, Penna.

## New County Highway Paved with Concrete

(Continued from page 38)

This fleet delivered 49 batches an hour on a 5-mile haul.

The batches were mixed by a Koehring 27-E paver running in the lane adjacent to the one being poured so as not to disturb the subgrade. One man bossed batch trucks and dumped the batches. Water, supplied to the paver from hydrants on the city mains, was brought along the shoulder in 3 and 2-inch pipe. The well-mixed batches were delivered to the subgrade and spread by three puddlers. Two men shoveled a rubber-tired wheelbarrow for hauling back as needed for low spots in the slab.

The paver regularly ran between 700 and 900 feet of the slab 12 feet wide and 10 inches uniform thickness in an 8-hour day, which was extended to 10 hours for the completion of the finishing.

Two interesting asides should be recorded here. The lubrication outfit for the grading and paving equipment was a stone boat carrying the required lubricants, ready to be towed along the shoulder by a small Caterpillar tractor to the handiest place for the greasing operations. The water boy carried a water tank resembling a small suitcase and painted black. Attached to this was a dispenser for paper cups of the folded type. The men each took one, filled it from the spring faucet, and then, because of the scarcity of paper cups, pocketed the folded cup for reuse.

### Finishing and Curing

The contractor used a pair of finish-

ing machines for the best production. The first, a single-screed Jaeger, was used as a strike-off with a home-made surface vibrator attached to the top of the screed, followed by a double-screed Blaw-Knox finishing machine. A Mall self-powered internal vibrator was carried along the shoulder adjacent to the pouring and used to vibrate the edges and all joints. Two men were kept busy sweeping the adjacent slab when working on the second lane.

Hand-finishing started with two men using 10-foot wooden drag straight-edges followed by two edgers putting the 1/4-inch-radius tooled edge against the forms. The same size edge was used for the expansion and dummy joints. The bridge from which the joint finisher worked carried an off-set string as a straight-edge to insure a neat line for the dummy joints. The concrete was then dragged with burlap to smooth out the spots where it had been disturbed, following which the joints were edged. The concrete was then given its permanent roughened finish with a fibre broom

pulled across the pavement.

Immediately after the broom finish the pavement was covered with burlap which was kept wet for 24 hours. After that time it was removed and the slab covered with Sisalkraft paper sealed at the edges with heavy clay to prevent the paper blowing away and also to prevent moisture escaping. It was further weighted with 2 x 4's laid across the surface at intervals of about 15 feet. This was left in place a minimum of 4 days.

(Concluded on next page)

**C. H. & E. CONSTRUCTION EQUIPMENT**

Three Ton Tandem Roller

For patch work. Operates same as automobile, slow forward and reverse speed, controlled by one hand lever. Both front and rear rolls can be filled with water. Easy to load on a truck for transportation from job to job.

Write for Bulletin 3810 N. Palmer St.

**C. H. & E. Manufacturing Co.**  
Milwaukee, Wis.

## THE PUMP THAT

*Stays on the job!*



ON the really tough pumping jobs where dirt, sand and grit take rapid toll of ordinary pumps, rugged CARVER centrifugals are setting records for consistent high performance. Long, trouble-free service is a job-tested fact about CARVER pumps that will mean dollars and hours saved on your job, for these outstanding centrifugals maintain their lightning-fast prime, their extremely high efficiency, even after thousands of hours of pumping.

For a pump that starts out ahead and stays ahead—specify CARVER on your job!

Gas engine, electric motor or belt-driven CARVER centrifugals are built in capacities from 5,000 to 125,000 G.P.H.

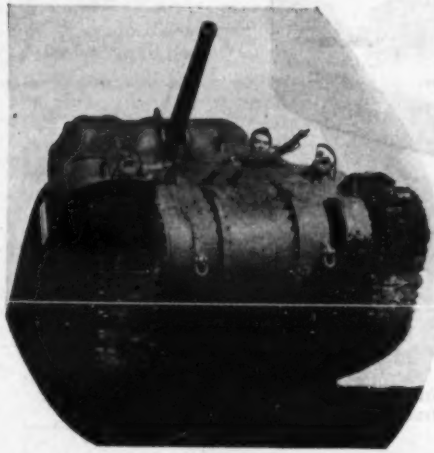
Get the facts about these efficient, long-lived pumping units—write NOW for your copy of the CARVER pump catalog.

**CARVER PUMP CO., Muscatine, Iowa**

**CARVER CENTRIFUGAL**  
*Certified*

## How Line Smashing Tanks Benefit Scraper Design

Ingenuity and experience used in solving war machine clutch problems have produced new developments that will help American manufacturers protect future markets by designing better post-war products or redesigning present models. Don't struggle with power transmission problems affecting peacetime machines. Our engineers are ready to help production engineers plan more compact, dependable and efficient applications of



## ROCKFORD OVER CENTER and SPRING-LOADED CLUTCHES and POWER TAKE-OFFS

SEND FOR THESE HANDY BULLETINS  
ON POWER TRANSMISSION CONTROL

They show HOW the construction advantages of ROCKFORD CLUTCHES and POWER TAKE-OFFS have been utilized to solve power transmission problems in a wide range of industries. They give capacity and dimension data. Contain application diagrams. Don't wait until ready to go into production before getting these useful bulletins.



Rockford Drilling Machine Division Borg-Warner Corporation  
314 Catherine Street, Rockford, Illinois, U.S.A.



Pullmore Multiple-Disc Clutches • Over-Centers and Spring-Loaded Clutches • Power Take-Offs



# Wartime Highway Job In Allegheny County

(Continued from preceding page)

and a maximum of 7 days. If the beam break gave a test of 475 pounds per square inch at the end of the 7 days, the pavement could be opened for contractor's traffic at once.

## The Joints

Expansion joints without benefit of dowels were inserted in the pavement every 120 feet and dummy joints cut in the fresh concrete every 20 feet. The expansion joints in the pavement were made of 3/4-inch Flexcell, with 1/2-inch in the curbs. The expansion joints were set 1/4 inch low and poured with hot crack filler heated in a Hauck asphalt heating kettle on the shoulder. They were immediately covered with coarse sand or pea gravel to prevent pick-up.

The dummy joints were cut behind the second finishing machine by a pair of angles welded together to form a slot 3 inches deep and 1/4 inch wide at the bottom and 3/8 inch wide at the top. A wooden bar was inserted to keep the slot from filling with the concrete. This was removed by the joint finisher and the joint poured in a similar manner to the expansion joints.

## Major Quantities

The major quantities for this Section 4, Contract 3, were:

Elevation, common	2,900 cu. yds.
Excavation, structure	50 cu. yds.
Preparation of pavement subgrade, berms and sidewalk areas	75,000 sq. yds.
Concrete pavement, 10 inches thick	44,000 sq. yds.
Concrete center strip	4,300 sq. yds.
Concrete curb with underdrain	1,000 lin. ft.
Concrete, special guard curb	12,500 lin. ft.
Concrete, berm gutter	3,300 sq. yds.
Aluminous-penetration base course, 8-inch, with 2-inch asphaltic wearing surface	7,800 sq. yds.
Wood post barriers	1,150 posts
Cry pipe culvert, 12-inch, extra-strength	100 lin. ft.
Cry pipe culvert, 15-inch, extra-strength	300 lin. ft.
Underdrain with 6-inch perforated vitrified-clay pipe	14,000 lin. ft.

## Personnel

The public works of the County of Allegheny are under the direction of the Board of Commissioners: John J. Kane,

Chairman; George Rankin, Jr., and John S. Herron. The design, construction and maintenance of all county highways, bridges and tunnels are delegated to the Department of Works, John B. Sweeney, Director; L. B. Duff, Chief Engineer; Charles F. Houlihan, Assistant Chief Engineer in charge of design; S. M. Madancy, Road Design Engineer; S. A. Shubin, Bridge Design Engineer; J. S. Devlin, Assistant Chief Engineer in charge of construction; H. J. Dickman, Construction Engineer, and C. K. Harvey, Office Engineer.

Contract 3 was awarded to the McCrady Construction Co., Pittsburgh, Pa., on its bid of \$315,883.00 for fine grading and paving 6,100 feet of Section 4 of the McKnight Road project. For the contractor, the work was in charge of H. L. Davenport, General Superintendent, and C. C. Catty, Superintendent.

## Mixer-Water Heaters For Winter Concrete

Essential construction must go on, winter or summer, in these days of stepped-up programs, and last winter many war construction jobs involving the placing of concrete were carried on despite low temperatures. One solution to the winter concreting problem is the use of a heater on the concrete mixer or paver. The American Steel Works, 1211 W. 27th St., Kansas City, Mo., points out in its bulletin on American Fireblo concrete-mixer heaters that these units are available for any type or size of mixer or paver, including tilting or the non-tilt type of mixers.

The American heating unit consists of a Fireblo torch-type burner, a combination bronze strainer valve, special discharge elbow or reflector pipe, an American pressure fuel tank equipped with a hand-pressure pump, air gage, air relief valve, fill cap, cut-off angle valve with fittings, and a length of special-treated oil hose with couplings. The American universal attachment makes it possible to clamp it to any convenient part of the mixer frame, while an adjustable stand will hold the burner in any position at

any height for directing the flame at any angle into the mixer drum.

The Type A heater is designed for use with tilting mixers only, while Type B has the universal attachment for use with pavers, non-tilting mixers, and tilting mixers equipped with power loaders. Further information on these American Fireblo heaters is contained in a bulletin, copies of which may be secured direct from the manufacturer on request.

## Brownhoist Office Moves

The Industrial Brownhoist Corp., Bay City, Mich., manufacturer of locomotive cranes, has announced that its Cleveland Sales Office is now located at 1812 Terminal Tower, Cleveland 13, Ohio. In addition to the Cleveland office, and the home office in Bay City, Brownhoist maintains sales offices in New York City, Philadelphia, Pittsburgh, and Chicago.



**WILLIAMS Buckets**

**WELDED ROLLED STEEL CONSTRUCTION**

eliminates cumbersome dead weight and insures a stronger bucket that will wear longer with less breakage and less cost for maintenance.

This welded design which has made Williams Buckets so universally used in steel mill service is now featured in all Williams Clamshell and Dragline Buckets 1/2 to 16 1/2-yd. capacities.

Send for free bulletin covering types of buckets for your particular requirements. It shows details of design and many exclusive features that clearly prove why YOUR NEXT BUCKET SHOULD BE A WILLIAMS

**THE WELLMAN ENGINEERING COMPANY**  
7012 Central Avenue • Cleveland, Ohio

**Built by WELLMAN**

**BUILT TO LAST AND MOVE DIRT FAST**

ARMY U.S. NAVY

# Washerless Construction Saves Time and Trouble . . . Cuts Costs!



The couplings described below are both washerless, having the same ground joint union illustrated at left, i.e.: a carefully rounded head on stem fitting concaved face of spud, and providing a perfect soft-to-hard seal that remains leakproof, regardless of wear or the presence of abrasive particles.

## "GJ-BOSS" GROUND JOINT

### FEMALE HOSE COUPLING, Style X-34

The strongest and most efficient coupling for high or low pressure steam, air and liquid hose. Correctly designed malleable iron "BOSS" Offset Interlocking Clamp anchors entire coupling to hose with powerful, all-round grip—it can't blow off. No leaking or lost washers to replace. Sizes: 1/2" to 4", inclusive.

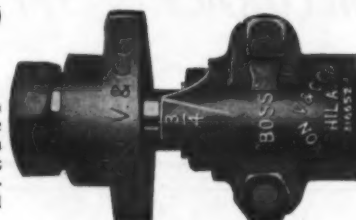


For Steam, Air, Hydraulic Hose

## "GJ-BOSS" GROUND JOINT

### AIR HAMMER COUPLING

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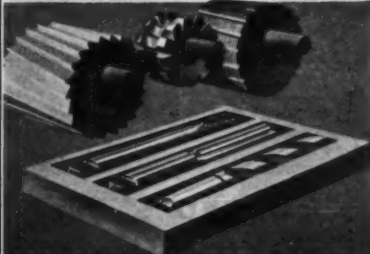
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Recent surveys have indicated that many motorists are not giving their cars proper consideration from the standpoint of crankcase motor-oil drain practice, according to L. C. Welch, Manager, Lubricating and Technical Departments, Standard Oil Co. of Indiana. These studies show that many drivers are operating their cars greater distances than formerly between crankcase drains, whereas this situation should be absolutely reversed if proper care of the automobile is maintained.

Under wartime conditions, cars are not only irreplaceable, but are absolutely essential to the nation's transportation facilities which could not possibly maintain the burden of moving war workers

and others now using their cars to get to work and for business purposes. To guard the life and health of the average automobile engine, Mr. Welch points out that draining of the crankcase should take place more frequently under wartime driving conditions than when cars were in more extensive use. Leading automotive engineers of the American Petroleum Institute last autumn formulated the recommendation that passenger-car crankcases should be drained and the chassis lubricated every 1,000 miles or every 60 days, whichever comes first; and that the transmission and differential drain period should be every 5,000 miles, or every spring and autumn.

Under wartime driving conditions, with a maximum speed of 35 miles an hour and a limited gasoline ration, the average car is used for short runs at low speed and does not reach an efficient operating temperature. Under these conditions, engine operating temperatures are low and the crankcase ventilating system does not operate efficiently under low-speed intermittent driving conditions. Water accumulates rapidly in the crankcase and when mixed with dirt, carbon, and oil, forms a water sludge which may clog oil screens and stop up oil lines, resulting in burned-out bearings. Unburned fuel works into the crankcase, diluting the motor oil and thinning it out dangerously. If dilution is excessive, bearings will hammer out when the motor is subjected to heavy load.

It is the patriotic duty of every car owner to preserve his equipment; proper lubrication is of primary importance in accomplishing this, Mr. Welch concluded.

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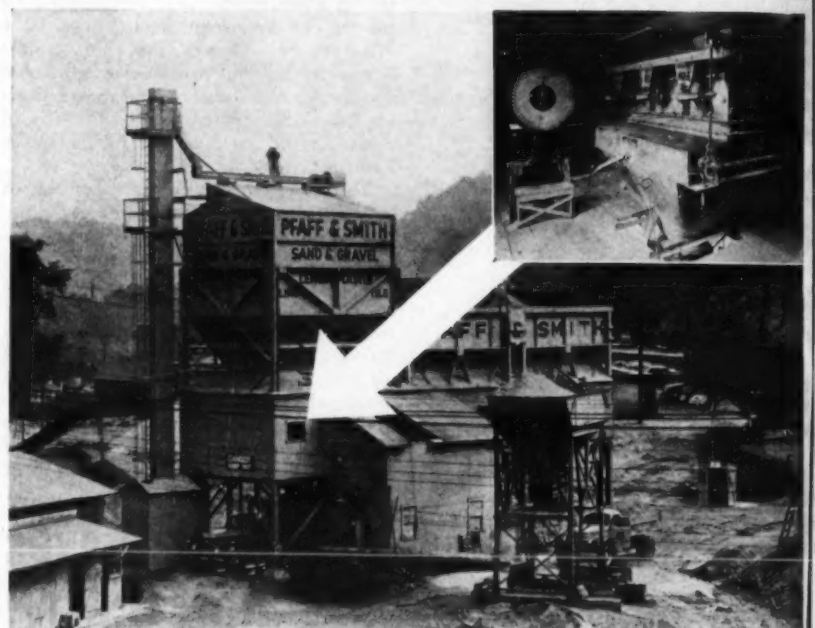


Photo by Helzel Steel Form and Iron Company

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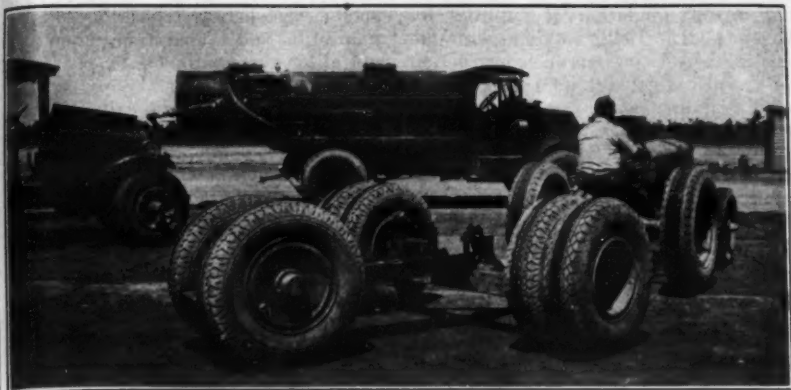
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C. & E. M. Photo  
A 10-wheel wartime pneumatic roller. The six rear tires are from the contractor's LeTourneau Carryall scraper.

## Runway Extensions

(Continued from page 15)

wheels, tires, and axles from a small LeTourneau scraper and attached a tongue so that they could be towed by a wheel tractor. The dual tires were so spaced that they supplemented the rolling of the tractor tires. Then the two front tires of the scraper were trailed after the others so as to fill in the space not rolled by the tractor or dual pneumatic tires. This outfit did a lot to complete the rolling in fast time in the absence of a standard pneumatic-tired roller, which the contractor was unable to beg, borrow or steal for use on this job.

The surface of the sand-cement mix tended to become very mealy toward the end of rolling and would not compact readily. The trouble seemed to be that the moisture left the surface and prevented bonding of the mix, but was overcome by adding a little more water and rolling with a smooth-drum roller towed by a pneumatic-tired tractor.

As the final operation of the sand-cement mix a strip 50 feet wide and 150 feet long across each end of the runway was processed transversely.

All strips were cured by covering with 4 pounds of straw per square yard on the morning of the day following mixing and compacting, and then keeping them sprinkled for 7 days.

### Tests

The state highway department set up a soil-cement laboratory, an 8 x 12-foot building, for constant tests by two soils engineers, and the Portland Cement As-

sociation sent a field engineer to work with these men for a considerable time because of the unusual character of the material. It is believed that this is the first job on which a non-cohesive sand has been processed for a cement-stabilization project.

The state soils laboratory, in its preliminary investigations of the materials on this job, found that 8.6 was the optimum moisture, but continued tests at the field laboratory showed that there was no gain in density between 6.6 optimum and the original 8.6, and also that with the larger amount of moisture the pneumatic-tired equipment was liable to bog down in the mix before it had set up.

The theoretical density of the mix was found to be 116 to 123 pounds per cubic foot, but the daily samples taken from each strip as processed have shown an average of 125 pounds and a maximum of 132 pounds.

### The Bituminous Surface

Upon completion of the sand-cement extensions to the runway, they, with the service roads which were also processed in a like manner, were surfaced with a bituminous material and fine aggregate to prevent wear of the material and to keep down dust. The sand-cement was thoroughly cleaned by a rotary broom and primed with one-sixth gallon of tar per square yard and allowed to cure. This was followed by the application of 0.35 gallon of tar per square yard covered with 35 to 40 pounds of stone, 1/8-inch and smaller, which was rolled by a 5 to 8-ton roller and then power-broomed and dragged until the surface was entirely free of irregularities.

Not sooner than 7 days later a seal of 0.2 gallon of tar was applied and covered with 15 to 20 pounds per square

yard of the same stone, rolled, broomed, and dragged to complete the surface.

In order to show a line of demarcation between the paved runway and stabilized extensions, if they have the same color tones, chevrons painted approximately 100 feet wide at the base may be placed at the ends of the paved section of the runway to form an area triangular in shape, with the base of the triangle at the ends of the runway. The chevrons may be at 45 degrees with respect to the center line of the runway and so sloped that the apex of the triangular area covered by the chevrons will fall on the center line of the runway.

The specifications state that the painted strips in the chevrons shall be 6 inches wide and 6 inches from the near

edge of the adjacent stripe. The stripes shall be made with a good grade of highway paint pigmented either white or yellow, whichever color offers the greater contrast with the runway surface.

### Personnel

The contract for the construction of this Flight Strip and the sand-cement extensions was awarded to Hendrickson Bros., Inc., by the state highway department, under the direction of the Public Roads Administration. The Flight strip will be used by the Army for the duration and then will probably be available for civilian flying, under maintenance by the state highway department, in accordance with the original arrangements for the construction of Flight Strips.

## This "tool of the times" multiplies man-power

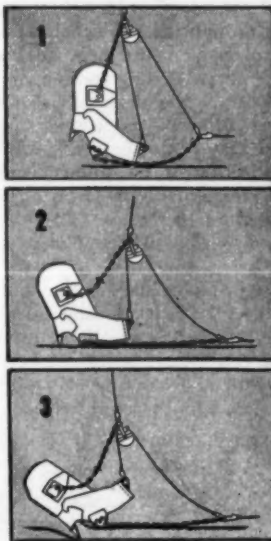
No. 610 Util-A-Tool.  
10-ton capacity. Pushes  
apart or pulls in 4 3/4".  
Wt. 74 lbs. in metal box.

The Simplex Util-A-Tool consists of 9 pieces of equipment used in various combinations to push, pull, tie forms, bind loads; clamp members for welding, etc.; bend beams and pipe; straighten bent structural members, etc.

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HOLDS A TIGHT THIMBLE. When thimbles are used they will not loosen and fall out.





Hand grading on the Inter-American Highway in Costa Rica, using Dumper-Dumpster units for hauling.

## Road to Panama

(Continued from page 27)

18 bridges.

Three of the Central American Republics having highway organizations partly or wholly equipped took contracts to construct the sections of pioneer road included within their limits. Guatemala undertook to reconstruct an existing dirt wagon road from Malacatan to Escuintla; El Salvador contracted to reconstruct and extend a road from San Miguel via Santa Rosa to the Goascoran River; and Nicaragua agreed to build a new road from the vicinity of Jinotepe to the Costa Rica frontier. It was necessary to provide Guatemala and El Salvador with some additional equipment, which was done on a rental basis.

Private contracts were made with the Foundation Co., New York City; Martin Wunderlich Co. of Jefferson City, Mo.; Swinnerton, McClure & Vinnell of San Francisco; and Ralph E. Mills of Frankfort, Ky., for road construction; and with the Frederick Snare Corp. for bridge substructures and steel erection. Bridge steel was fabricated by contract by the United States Steel Export Co.

The Swinnerton contract covers the section of pioneer road in Honduras from the Goascoran River at the Salvador border to El Espino on the Nicaragua line, following throughout the location proposed for the final standard construction on the Inter-American Highway and amounting to 164 kilometers. In addition, the Swinnerton associates have the northern section in Nicaragua from the Honduras line to Sebaco, where present standard construction will be continued to Jinotepe.

The Foundation Co. undertook to construct the section in northwestern Costa Rica from the Nicaragua line, practically at the shore of Lake Nicaragua, to Naranjo. Difficulties, discussed in more detail later, in securing equipment and supplies led to the termination of the contract with the Foundation Co., however, and at this time the work is being carried on by force account.

The Ralph E. Mills Co. has a very difficult section in central Costa Rica from Cartago to San Isidro del General, about 94 kilometers long, that crosses the Continental Divide at an elevation of 10,931 feet in extremely rough terrain.

Wunderlich continues the work in southern Costa Rica down El General Valley via Buenos Aires and Paso Real to the Panama frontier, thence across the Chiviqui Plateau, and down the mountain to Concepcion and David, at which latter place terminates the construction of the Central Highway in Panama.

The Frederick Snare Corp. was awarded a contract to construct six bridges: one over the Goascoran River on the Honduras-El Salvador line; two in Honduras at the Guacirope and the Rio Grande near Nacaome; one at the Ocho-mogo north of Rivas, Nicaragua; and one each at the El General and Brus Rivers in southern Costa Rica. This contract has been augmented by additional bridges as steel has been made available. Three additional structures in Nicaragua, for which substructures are already complete, were first added and later nine structures in Costa Rica were included. The latter, with one exception, lie in El General Valley between the General and Brus bridges originally provided for.

### Difficulties Are Many

As should be expected, under the circumstances coincident with the development of this construction program, the difficulties of organization have been exceptional. Although the project was not undertaken solely as a war measure, because the cooperative construction and the greater part of the necessary funds were provided before the forced entrance of the United States into the war, nevertheless the addition of the pioneer sections and the expedited program were obviously incident to defense activities from the point of view of transportation insurance.

This original plan called for the completion of all surveys, the letting of all contracts, the assembling of all required equipment at convenient points in Central America, the construction of camps

and the accumulation of supplies by November 15, 1942, so that, with the opening of the dry season, construction could be started simultaneously at all possible points. Contracts were let in August, less than a month after final instructions to proceed. But the difficulties in securing equipment and forwarding it to points in Central America were

such as seriously to retard the initial organization and preparation. Even today not all needed equipment has arrived on the respective sections.

The original program called for completion of surveys by November 15, 1942, and completion of the pioneer road by May 15, 1943, at which time the

(Concluded on next page)

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WHEN your crusher jaws become seriously worn, don't think of throwing them on the scrap pile. Instead, save yourself the trouble of a costly replacement and an annoying shut-down by doing what one company does,—and that is to hard-face worn crusher jaws with wear-resistant Coast Metals. Here 4,900 tons of material are now

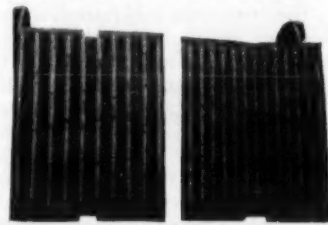
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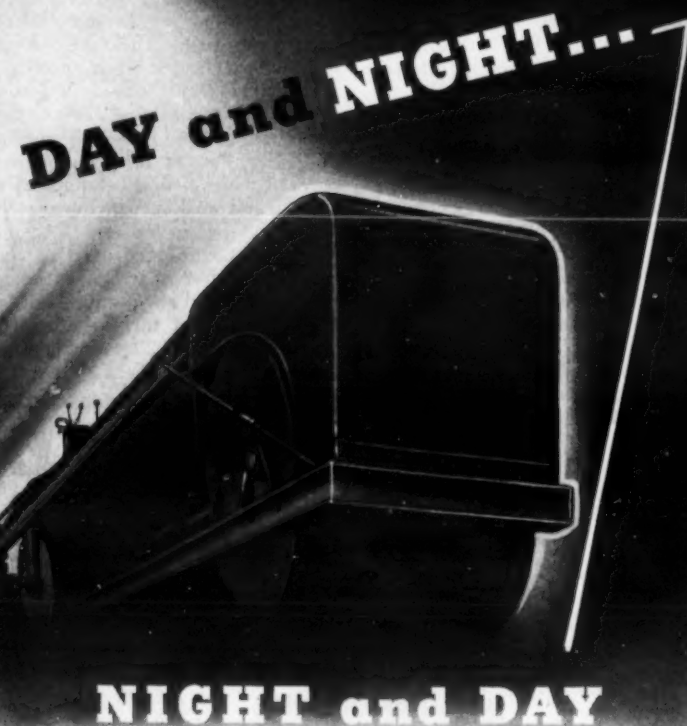
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## WHEELBARROWS





Grading and paving equipment on the Panama section of the Inter-American Highway.

## Tough Going

(Continued from preceding page)

rainy season might be expected to open. This provided for about six months of construction season for 1,637 kilometers of road under eight contractors, or roughly 35 kilometers (about 22 miles) per month per outfit. As some sections of the route could be approached at numerous points beside the ends, it was expected that enough construction gangs would be put to work to complete such a program with relative ease.

The almost complete failure of transportation by water to Central America from ports of the United States on both coasts not only quite destroyed the possibility of carrying out the original program, but emphasized as almost nothing else could the necessity for the very project which was being prevented by the inevitable course of events. Indeed, so keen became the pressure to secure some outlet from Central America that plans were successfully carried forward to construct a railroad bridge at the Suchiate River between the towns of Mariscal and Ayutla at the head of rails respectively in Mexico and Guatemala. But the building of the bridge and the creation of a freight transfer station at Ayutla, Guatemala, did not come in time to relieve the need and so difficult became shipping conditions that one contractor was entirely unable to equip his job and the contract was cancelled.

Other unexpected difficulties have been encountered. The rainy season that normally would have tapered off to 3 or 4 inches for December, with most of that before the middle of the month, carried on almost unabated in the upper elevations and often in the lower into January, February and even into March in some places. As the job was in large part one of making dirt fly, the continued rains rather effectively interfered.

The completion of the instrument survey over the hitherto unsurveyed section of the Continental Divide in Costa Rica revealed an exaggerated series of conditions, expected in lesser degree but occurring far beyond anything previously contemplated. It was known from reconnaissance surveys carried out over wide areas in southern Costa Rica that the construction there would probably be the most difficult between Mexico and the Canal Zone. However, it was thought that the elevations already reached in Mexico and Guatemala would exceed anything required to get over the Con-

tinental Divide in Costa Rica, but the section between Cartago and San Isidro del General in Costa Rica is by far the most difficult to construct between Alaska and the Canal Zone.

The altitude at the pass as developed by instrument surveys is 10,931 feet, about 400 feet higher than any other point along the route. There are some 30 kilometers of heavy rock excavation along the highest part of the line where a volcanic dike rises through the sharp slopes of the cordillera and comes so close to the surface as to enter the road prism throughout a long series of cuts. This source dike makes the descent from the pass to within about 15 kilometers of San Isidro extremely difficult. The average excavation for 27 kilometers will exceed 157,000 cubic meters a kilometer and one kilometer will run above 366,000 cubic meters. This is roughly 760,000 cubic yards a mile.

Engineers of the Public Roads Administration who are familiar with the heaviest highway construction in the United States over the Rockies and in

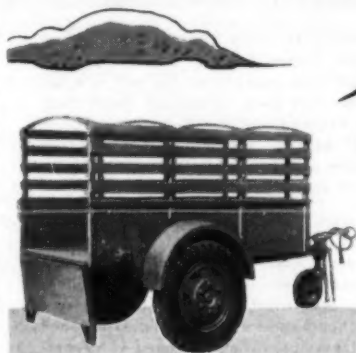
the high Sierras pronounce this section the heaviest road work ever encountered anywhere. Reconnaissance conducted at intervals over several years, in a fruitless search to pierce the coast range on a more favorable route through a mythical low pass, convinces all concerned that, with the well known Meseta Central and the valley of El General River as objectives, no better route can be found. The highway over the Continental Divide between Cartago and San Isidro, about 94 kilometers in total length, will start at an elevation of about 5,000 feet, climb to 10,931 and descend to 2,500 feet at San Isidro—that is, climb a mile up and a mile and a half down.

To have constructed a pioneer road across this area would be about as difficult as to build to final width, providing the final line was to be followed. To abandon the final proposed line in favor of one following around the contours would have resulted in a road dangerous in the extreme, if indeed possible, in view of the sheer rock precipices that occur intermittently throughout the high altitudes. So through this section, included in the Mills contract, the standard line will be followed with some concession in the proposed standard grades.

When completed, this section will constitute one of the most scenic and impressive stretches on the entire line from the United States to the Canal. The Atlantic and Pacific will both be visible from the top at many points, with the Pacific over 30 miles away and the Atlantic over 50.

### Program Changed

Owing to the slow start and continuing difficulties of transportation of equipment, supplies and materials, the original program will not be possible.



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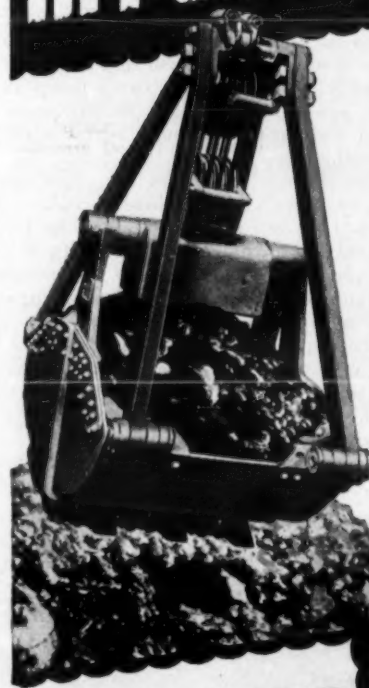
Your Planning Aid for Tomorrow's Progress

But the road will be constructed either as a pioneer or standard highway across Guatemala, Salvador, Honduras, Nicaragua, and Panama by July 1, 1944, and the Costa Rica section should be through by July of the following year. Probably a pilot road, sufficient for the passing of construction equipment, will be completed in Costa Rica this year.

Following the completion of the pioneer road sections, standard road construction will proceed without interruption. The surface will be widened to 6 meters (about 20 feet) and the grade to 9. The profile will be corrected where necessary to conform to the standard specifications of 6 per cent and compensated 7 per cent where necessary. Temporary structures where now introduced will be rebuilt in permanent form and the entire surface finished with a bituminous penetration or surface treatment.

The total length of the combined standard and pioneer route from the Suchiate River at the southern Mexican frontier to Balboa basin in the Canal Zone will be 2,561 kilometers.

**HAISS**  
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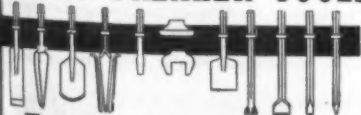
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2 LIME STREET ROCKLAND, MAINE





C. & E. M. Photo  
The Tippecanoe County mechanic-welder uses arc welding for many jobs these days. Here he is welding short lengths of I-beams with plates for bridge stringers.

## Indiana County Shop Uses Quality Material

(Continued from page 47)

brick structure on by-pass Route 52, on the outskirts of Lafayette. Most of the building is used for the storage of equipment. An overhead door near the center of the front of the garage and another similar door at the opposite end from the office and shop give easy access to the storage section. Seven unit heaters, furnished with steam by a boiler in the basement of the building, provide ample heat to keep all trucks in good condition during the winter so that they start readily. An automatic sump pump in the basement takes care of any water gathering in the basement, which is below the sewer line on the street. The boiler is hand-fired with coal, and the adjacent bin holds a carload of coal.

As Lafayette is the business center for practically the entire county, having five supply houses, the county has never maintained a large stock of parts, preferring to rely on these firms.

The small shop is well equipped with a good choice of tools, to which the ingenious mechanic has added a number of his own design and manufacture. The equipment includes two Smith gas welding outfits, one mounted on a shop truck

and the other arranged for easy shipment into the field, a forge and anvil, a pneumatic press made from the cylinder of a 5-ton dump truck, a J. D. Adams arc welder, and a J. T. Ryerson drill press. Bolts, nuts, and similar small parts are stocked in small bins in the shop, while more expensive materials and parts are located in a locked stock room adjacent to the office.

A long metal-top bench running across the end of the shop would provide ample space for several mechanics, but at present, due to the war situation, only one mechanic is on duty. Truck and equipment drivers help the shop mechanic on repairs on their own trucks, thus obviating the need for hiring a helper all of the time in the shop. A hand arbor press is mounted on the bench as well as a Sioux valve-seat-ring tool. Additional equipment includes 12, 7, and 5-ton Blackhawk hydraulic jacks, a 3-ton Manley floor jack, and a complete stock of taps and dies. The garage compressor is a home-made affair, using an old compressor with the dome from a Monon RR locomotive for the receiver.

The mechanic has made a tire remover for large tractor tires out of a spring and some junk metal in the shop. It works on a toggle principle and is very effective in moving large tractor tires which have been on the rim for a considerable length of time.

The county prides itself that it always uses the highest grade of oil for the lubrication of all trucks and equipment. It has found through experience that the maintenance costs of engines and equipment are greatly reduced by the use of high-quality lubricants. All trucks and equipment are greased once a week or about every 500 to 750 miles. The patrolmen have been trained to report any troubles immediately to the garage mechanic so that they may be corrected before they become serious.

The stock of steel for bridge work or repairs is very low, so that the ingenuity of the shop mechanic is called upon constantly to furnish necessary repairs. At the time of our visit he was arc welding 5-foot and shorter lengths of I-beams with plates to form 10-foot bridge stringers.

The shop, as well as the entire garage, is well protected from possible loss by fire through the installation of several types of fire extinguishers. There are two boxes of six Shur-Stop hand bombs on either side of the machine shop, one

of them located adjacent to the stock room. In addition, two Fyr-Fyter acid-and-soda extinguishers are mounted in the shop area, and several Shur-Stop extinguishers, with fuses to drop them in case of fire when no one is around, are mounted at strategic points and others are hung from the wood roof, which is

supported by steel bow-string trusses.

The gas pump for refueling equipment is located just inside the door of the garage, with the tank buried outside.

A 30 x 60-foot enclosed wood storage shed has been built back of the garage. In it is stored extra lumber, the equipment

(Concluded on next page)

## BEFORE, DURING & AFTER!

### BEFORE

the war, NOVO pumps, hoists, engines, generators and pavement breakers were engineered and built to do their jobs well—on day in and day out performance.

### DURING

the war, NOVO ruggedness is fully meeting the increased demand of war and our equipment is serving in every war theater. Emergency production is teaching us new skills which will be a part of the post-war NOVO equipment.

### AFTER

the war, we will be in position to deliver NOVO equipment without your having to wait for time-consuming factory change-over. Because, standard NOVO products were found to satisfy war requirements, making drastic changes unnecessary. That puts you in position to get, from NOVO, the things you need to speed up rush construction which will follow closely on the heels of peace.

We are in production on some types of equipment for civilian use on essential work. Tell us what you need NOW in the way of pumps, hoists, light plants, pavement breakers and engines.

# NOVO

ENGINE COMPANY

LANSING, MICHIGAN



Diaphragm and Pressure Pump



Light Plant



Hoist



Self-Priming



Pavement Breaker

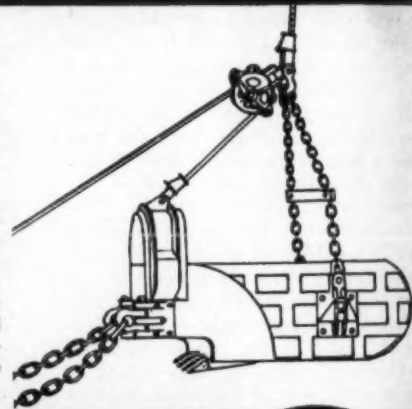


Engine

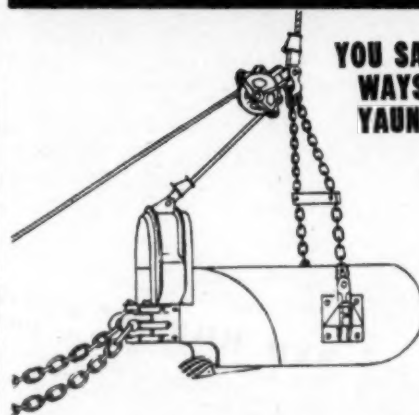
## YAUN'S BASKET TYPE ALL-WELDED BUCKET

YAUN'S basket type bucket is an innovation in the digging field. It is a duplicate of the shell type, except that the rear is made of heavy flat bars, instead of sheet steel. When handling wet dirt, there is no suction to hold back the discharge. It is designed to handle any loose material, except "soup." The dirt does not fall through the holes.

This basket type bucket has the same arch as the shell type, which is proof against distortion—you'll never see a Yaun Bucket with the front "caved" in. The lip is also stellite, which makes it last longer and has the same connection between arch and lip as the shell type. These buckets are equipped with American manganese tooth bases with removable tooth points.



## YAUN'S SHELL TYPE ALL-WELDED DRAGLINE BUCKET



YOU SAVE THREE  
WAYS WITH A  
YAUN BUCKET:

- 1 More pay load, less bucket weight for same gross weight, more yard per cycle at same cost.
- 2 Faster dumping means more cycle per shift at no additional cost.
- 3 Less dead weight to swing back, empty faster, return and more cycle per shift at no additional cost.

YAUN'S shell type bucket is furnished with American manganese tooth bases and removable tooth points. But if you wish, they can be supplied. The bottom of the lip is stellite and as the lip wears, the bottom remains and causes the lip to become exceedingly sharp. The lip is guaranteed to remain sharp during the life of the bucket. The arch is so constructed that it adds strength and durability to the front end.

The weight of this bucket is about one-third lighter than that of any other bucket of similar capacity, yet you'll find it will last longer. This will naturally enable you to move from 30% to 50% more dirt at no increase in cost—often the difference between profit and loss of a job.

Patented

YAUN DRAGLINE BUCKETS & MFG. PLANT  
BATON ROUGE, LOUISIANA

## LINN HAFTRAKS HAVE THE POWER TO PLOW THE DRIFTS

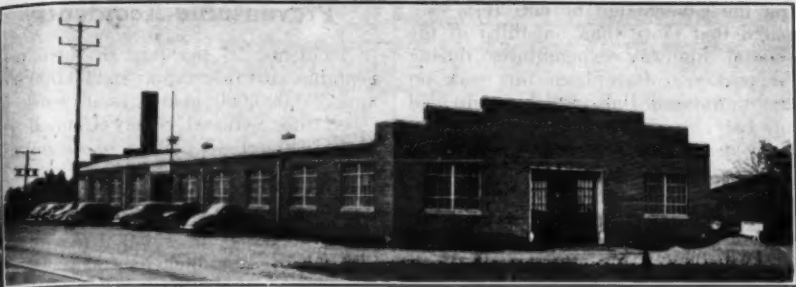


Stamina, drive and structural strength are built into LINN HAFTRAKS for the hard work of clearing heavy snowdrifts in open country.

The exclusive CONTOUR-FOLLOWING TRACTION makes Linn Hafttraks as effective for winter service as for off-the-road operations throughout the other seasons.

THE LINN MANUFACTURING CORPORATION, Morris, N. Y.





C. & E. M. Photo  
Exterior of the Tippecanoe County, Ind., Highway Department Garage.

## Well-Selected Roster Of County Equipment

(Continued from preceding page)

ment trailer, two snow plows, a tar kettle, and also some bridge lumber in excess of that stored in the end of the garage opposite to the shop.

### Equipment Roster

The county maintenance equipment used in the field includes eleven dump trucks as follows: one 3 to 5-ton GMC, one 3 to 5-ton International, two 3 to 5-ton Whites, two 2½-ton Internationals, two 2½-ton Whites, one 1½-ton GMC, two 2½-ton GMC's, and one platform-body Indiana truck with a tripod and winch driven by the power take-off. There is also a GMC tractor truck with a winch and fifth wheel, which tows the home-made equipment trailer.

The county uses five J. I. Case tractors, two Model I-40 Internationals, and one Huber Model HS tractor for pulling the maintainers. The maintainers consist of five old Adams maintainers, one Galion, and two new Adams maintainers with runners.

Other equipment includes a 2-inch Gorman-Rupp pump, a Jaeger 2-bag

mixer, an Austin-Western 10-ton roller, two Adams and one Huber power graders with 12-foot blades, three Toro mowing machines, one Nelson loader, one Caterpillar D7 tractor, and a 5-yard Adams scraper. The county also has a Pioneer portable crushing plant which it purchased second-hand and rebuilt, with a Cedarapids jaw crusher, and an extension on the frame for mounting a 1916 Huber tractor engine. When set up in the field, it is fed by a slackline cableway.

### War and Peace

The overnight transition to wartime production of Caterpillar products, as well as the anticipated switch back to the task of rebuilding the world in times of peace, is graphically told in a 16-page booklet just released by the Caterpillar Tractor Co. Photographs and paintings are used to illustrate this timely story, and show modern construction machinery at work on both peacetime and wartime jobs.

Free copies of this booklet, Form 7993, may be secured upon written request to the Caterpillar Tractor Co., Peoria, Ill., and mention of CONTRACTORS AND ENGINEERS MONTHLY.

## Renegotiation

(Continued from page 4)

are kept of the proceedings and the industrialists involved are not even allowed to make personal notes of what goes on. Nothing that happens in these star chamber sessions fits into any reasonable definition of 'negotiation'. The Government officials pull a figure out of a hat, refuse to say how it was arrived at and inform the industrialist that he must accept the figure 'or else'. He is told that he has no recourse in the courts and that if he does not hand over to the Government the sum stated he will (a) have his funds impounded by the Government, (b) receive no more business from the Government or from other war industries and (c) have all the tremendous publicity resources of the Government marshalled against him."

There have been, without doubt, some cases where through some oversight in the original contract, possibly the incompetence of those making the award,

renegotiation might work to the benefit of the government and the taxpayer, but this is scarcely a justification for the methods mentioned in the editorial. If the tax laws of the country are not sufficiently well written to permit recapture of the excess profits of both a contractor and a war worker, then they had better be rewritten by an enlightened Congress, but let's keep the Inquisition out of American government.

## NEED A BIG Trailer?

La Crosse Makes Them Up To 200 Ton Capacity.

.. WRITE OR WIRE ..

LA CROSSE TRAILER & EQUIPT. CO.  
LA CROSSE, WISCONSIN U. S. A.

## Warm-ups FOR "FROZEN" MOTORS AND MEN

In bleak and frigid Northlands, air crews use unit heaters, powered by gasoline engines; to pre-heat motors, and other vital units of the plane — to prevent damage, and speed-up preparations for the take-off. One more front-line duty for the hundreds of thousands of dependable, instant-starting Briggs & Stratton 4-cycle engines serving our armed forces in hundreds of special and standard applications.



THE war's unprecedented demands have given us the opportunity to successfully meet a double challenge. ONE — to set new all-time records for production. TWO — to constantly maintain, even under wartime stresses, Briggs & Stratton high standards of quality, rugged dependability, precision manufacture and economical performance.

Thus we are better prepared than ever—to help on your present war needs or your postwar planning—and to keep up the Briggs & Stratton tradition as builders of "the world's finest air-cooled gasoline engines."

"It's powered right — when it's powered by Briggs & Stratton."

BRIGGS & STRATTON CORPORATION  
MILWAUKEE 1, WISCONSIN, U. S. A.

BACK THE ATTACK  
BUY WAR BONDS



## FORM-TY ENGINEERING FACTS

"Tystrus" are Engineered All Ways for Greater Strength—Greater Safety.

Diam. Inches	No. of Struts	Safe Load lbs.	Ult. Load lbs.
1/2	2	4000	9500
3/4	2	12000	19000
1	2	18000	27000
1 1/4	4	24000*	38000*
1 1/2	4	30000	55000
1 3/4	2	4000	9500
1 3/4" Water-Seal	2	4000	9500
1 3/4" Coll. Cone	2	4000	9500

## PUT MONEY IN YOUR POCKET

### WITH THESE TIME & DOLLAR SAVING ADVANTAGES

- Light Weight—½ the steel required for field assembled devices.
- Great Strength—engineered for ultimate loads up to 55,000 pounds.
- Streamlined Simplicity—capable of many job combinations and field uses.
- Assembles Quicker—coarser threads than ordinary rods speeds work.
- Double Duty—acts as spreader with ends against form face or unthreaded cones.
- Better Job—the end keeps back from form as much as 3".
- Many Sizes—7 standard units and specials to specification.
- Less Costly—working parts loaned, not sold, not rented.

Why not take a tip from the Army, the Navy, and some of the largest construction companies in the country? Turn to Richmond and get the benefits of Form-Ty Engineering—that begins with your job plans and carries through to its promptly delivered and tagged for their location on your job. It's this scope of service that makes "Richmond" the first choice of construction engineers.

**RICHMOND SCREW ANCHOR COMPANY, INC.**

816 LIBERTY AVENUE • BROOKLYN, NEW YORK







C. I. A. Photo

A completed viaduct on the Santos-Sao Paulo highway in Brazil.

### Construction Pumps Help Marine Salvage

In announcing that the U. S. S. Lafayette, formerly the French Liner Normandie, now floats on an even keel at her berth in New York harbor, officials also revealed that contractor's pumps played a vital part in her resurrection.

Salvage operations, started shortly after the 75,000-ton ship rolled on her side and settled into the harbor mud following the fire aboard her on February 9, 1942, were climaxed by the job of dewatering and refloating the huge hull. Removal of the 100,000 tons of water from the ship began early in August with the installation of a large battery of 3, 6, and 10-inch gas-engine-driven centrifugal pumps, mounted on hinged platforms in the above-water portion of the ship's interior. As the ship's list was

corrected, the platforms were hoisted to level positions.

Approximately half of the pumps used in this job were centrifugals made by the Carver Pump Co., Muscatine, Iowa.

### Large-Scale Road Program Being Pushed by Mexico

In order to help relieve the strain on her railway system caused by increased shipments of minerals and other war-essential materials to the United States, Mexico is pushing a large-scale highway construction program which last year cost nearly \$35,000,000. In view of the plans for the next few years, it is expected that Mexico's highway expenditures will be maintained at a high level.

The major road construction effort is on the uncompleted section of the Inter-American Highway between Mexico City

and the Guatemalan border. It is estimated that more than one-third of the Federal highway expenditures during the past year have been for work on this unfinished link, which is divided into two phases, one being the paving of highway sections already open to traffic, and the other phase the construction of a new road through jungle and mountain trails in southern Mexico. In the latter phase of the road program, Mexico is facing great difficulties. Road builders have to blast their way through jungles and a mountain terrain second only to Costa Rica's Cartago-San Isidro section for magnitude of obstacles.

Because of the formidable task confronting Mexico in completing her part of the Inter-American Highway, the Export-Import Bank of Washington late in 1941 provided a credit of \$30,000,000 to Mexico, of which approximately \$10,000,000 has been borrowed for road construction. Except for this credit and occasional technical advice from U. S. highway engineers, Mexico has handled all highway construction on her own.

### Preventable Accidents

Accidents, 97 per cent of them preventable, cost this nation \$5,200,000,000 and 380,000,000 man-days of work in 1942, the National Safety Council reveals in the 1943 edition of its annual statistical yearbook "Accident Facts".

On-the-job accidents killed 18,500 workers, 500 more than in 1941; injured 1,750,000, or 150,000 more than in 1941; and resulted in a loss of time sufficient to have built 18,000 heavy bombers or 55 battleships. All-accident death totals in 1942, including occupational, were 93,000 killed and 9,200,000 injured.

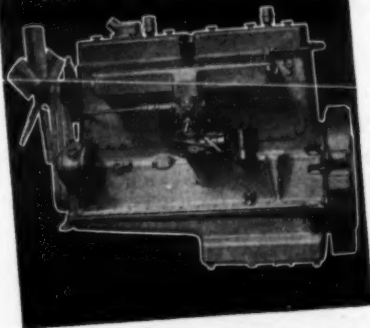
Had our enemies inflicted such heavy casualties upon us, we should be roused to a frenzy of activity to lick the Axis and stop such cost in human life and suffering. Just remember that 97 per cent of the accidents reported were preventable which means that a concerted action for safety on the job, on the highway, and at home can greatly reduce these accident totals.

**CRITICAL MATERIAL**....by the payload!



**WAUKESHA ENGINES**.....

Iron ore is hauled right from the mine by Walter Tractor Trucks, with 35-ton side dump ore trailers, powered with 300-hp. Model 6-WAK Waukesha Engines, 6½" bore x 6¼" stroke, 1197 cu. in. displacement.



...give Walter Ore Tractors extra power

Snyder Mining Company, Chisholm, Minn., has an off-the-highway hauling job that's tough—hauling iron ore right out of the mine.

Walter Tractors are doing it . . . and doing it well. All four of these new ones have Waukesha Engines.

These big, butane-burning Model 6-WAK Waukesha Engines are designed and engineered to deliver greater power per cubic inch displacement. Or, as the mining company's truck drivers call it—"plenty of power and lots of zip" according to Mr. Tancig, general mechanical superintendent, who also says, "the truck drivers like to drive these large units."

Get Bulletin 1138.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.  
NEW YORK • TULSA • LOS ANGELES



**WAUKESHA ENGINES**



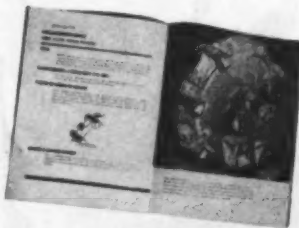
ONE WORN PAD + HIGH CARBON = 1 NEW PAD

ONE WORN PAD + HIGH CARBON + STODDY SELF-HARDENING = 2 NEW PADS

**U**SE of high carbon electrodes alone for building up track pads will merely restore pads to original life. But the addition of a hard, wear-resistant Stoddy Self-Hardening application over the high carbon doubles the effective life of the reclaimed pad...equals in performance two new unprotected pads...and saves the down-time and extra labor for an unnecessary build-up! Additional cost of material and labor are negligible compared to results obtained.

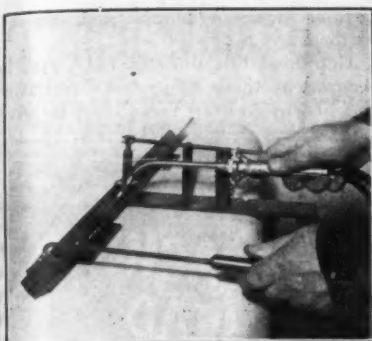
Stoddy Self-Hardening saves machinery...adds hours to equipment life...cuts out unnecessary down-time for repairs. A trial order of 250 lbs. of Stoddy Self-Hardening will hard-face all pads on an average shovel (up to 5-yard capacity). Many other profitable applications are described in Stoddy Specification Sheets. Send for your free copy.

STODDY COMPANY • 1131 W. Slauson, Whittier, Calif.



**STODDY HARD-FACING ALLOYS**  
*Stop wear... Eliminate Repair*





An easily made jig for speeding up the splicing of welding-rod stubs. It saves oxygen and acetylene too.

### Save Welding Stubs To Conserve Metal

Save your welding rod stubs; don't toss them away carelessly, says an article in a recent issue of *Oxy-Acetylene Tips*. In these times all metals must be conserved, but welding rods particularly should never be permitted to go to waste. A few small stubs may seem a very slight waste, but this waste all over the country can continue to grow and in a year's time the sum total of welding rod wasted would be enough to furnish a year's supply for many welding shops.

Place some empty boxes or metal cans at convenient locations, into which your welders can toss the stubs when they become too short to hold comfortably, providing one receptacle for each kind of rod used. Then, periodically, the operator can weld together all the scrap pieces into usable longer lengths. The article suggests that welding them all in spare time at one "sitting" is much more satisfactory and economical than welding a few at a time.

A simple jig that speeds up the welding of stubs together is shown in the illustration. This jig can easily be fabricated from scrap material found in the shop, and consists essentially of a light angle-iron trough in which one stub is held by a spring-operated clamp. The next stub to be welded on is placed in the bottom of the V and shoved into position by a pusher. A piece of 5/16-inch or 3/8-inch steel plate, welded to the under side of the angle iron beneath the point where the rods are to be joined, serves as a chill block to prevent the trough from being overheated during the welding operation.

Complete working drawings for fabricating this jig and 21 other useful gadgets are given in a 48-page booklet entitled "Shop Equipment That You Can Make", copies of which may be secured by contractors and state and county highway engineers direct from The Linde Air Products, 30 E. 42nd St., New York 17, N.Y.

### New National Fire Codes For Flammable Materials

The 1943 edition of National Fire Codes for Flammable Liquids, Gases, Chemicals and Explosives, superseding the 1938 edition, has recently been published by the National Fire Protection Association, and brings together the many standards dealing with the hazards of fires and explosions. The codes, which are purely advisory as far as N.F.P.A. is concerned, indicate the best practices in handling and storing flammable substances and are widely used as a basis of law.

The new volume is divided into nine parts, and covers such subjects as the storage and handling of gasoline and other petroleum products, oil and gas-burning equipment, utilization of flammable liquids, and storage and handling of explosives and nitrocellulose materials.

Copies of this 1943 National Fire Codes may be secured by those interested direct from the National Fire Protection Assn., 60 Batterymarch St., Boston, Mass. Price: \$3.00.

### New Booklet Aids Care Of Engine Cooling System

Owners and operators of motor vehicles or any kind of equipment in which liquid-cooled engines are used can save themselves a lot of trouble and expense by faithful attention to the information and recommendations in a 34-page pamphlet recently issued by the Office of Defense Transportation. Titled "Cooling System: Cleaning, Flushing, Rust Prevention, Antifreeze", this booklet was prepared for the ODT by the Society of Automotive Engineers, and provides in a single pamphlet the best thought of automotive engineers on the care of liquid cooling systems and the liquids used in them.

In simple terms and with many illustrations, the seven sections of the pamphlet give detailed instruction on checks and tests for cooling liquid losses; routine maintenance of the cooling system; finding the causes of overheating and overcooling; on causes of corrosion and rust prevention; factors leading to clogging of the cooling system and ways to prevent it; and on different types of anti-freeze and their use.

With the approach of winter, the shortage of permanent types of anti-freeze indicates probable wide reuse of used antifreeze which should be tested and may need the addition of acid and rust inhibitor and fresh antifreeze. The section on antifreeze explains simple ways to test its strength and what should be done to obtain the safest reuse.

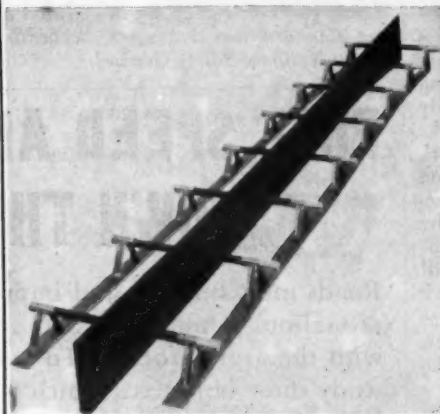
Copies of this pamphlet may be secured without charge from the Office of Defense Transportation, 1147 New Post Office Bldg., Washington, D.C., from your local district office of the ODT Division of Transport, or from regional offices of the ODT Office of Information.

### Army-Navy "E" Awards

The following companies have recently received the Army-Navy "E" Award: Le Roi Co., Milwaukee, Wis., for excellence in production of compressors for use by the armed forces; the Pershing Road Plant of the Link-Belt Co., Chicago, Ill., for excellent production of vital war material; Ransome Machinery Co., Dunellen, N. J.; and the Trackson Co., Milwaukee, Wis., for outstanding production of tractor equipment and ordnance matériel for the armed forces. The LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, has received a renewal of the Award.

For ease of assembly and speed of installation of expansion and contraction joints,

## use TRUS-ASSEMBLY



It brings extra profits to the contractor by reducing installation costs to a minimum;

also saves the government money by eliminating maintenance expense caused by inaccurate alignment of dowels.

Write for circular

HIGHWAY STEEL PRODUCTS CO.

Chicago Heights, Illinois

Let Old Man Winter do his worst! Install an AMERICAN CONCRETE HEATER—

—and you can mix almost as rapidly as in summertime.

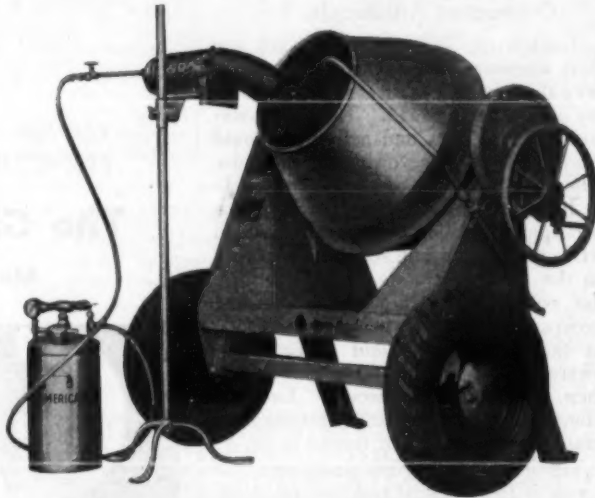
American Concrete Heaters

are made in a variety of sizes and styles to suit every make, model and size of mixer on the market. The heating unit includes the American FIREBLO Torch Type Burner—ideal for heating, thawing, burning—producing over 2000 F. burning kerosene, distillate or light fuel oils.

Immediate Installation, Adjustable Attachments furnished complete for each make of mixer

AMERICAN STEEL WORKS KANSAS CITY, MO.

Write for Circular



## and now! the GARBRO SHIMBLE

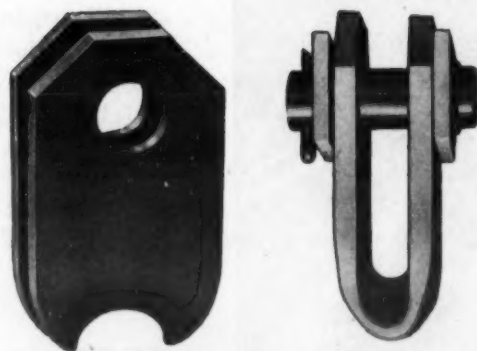
The new GAR-BRO SHIMBLE is a wire rope fitting that is both a SHackle and a thIMBLE. No special connection required—just clip or splice a loop in the end of a rope and slip the rope over the SHIMBLE.

This new device has a multitude of uses in the construction and industrial field. The GAR-BRO SHIMBLE gives better rope protection than any shackle and thimble combination you can buy. Increase your rope efficiency and economize by using GAR-BRO SHIMBLES on all your cable hook-ups.

Gar-Bro SHIMBLES are forged from structural steel bars thereby permitting welding to other attachments or bending of side plates to fit special conditions. The photograph at right shows the application of an open SHIMBLE and a CLOSED SHIMBLE to the boom topping hog-cable on a crane. There are many other applications—too numerous to mention here.

GAR-BRO DISTRIBUTORS

Edward R. Bacon Company . . . San Francisco, California  
Garlinghouse Brothers . . . Los Angeles, California  
Loggers & Contractors Machinery Co. . . Portland, Oregon  
A. H. Cox & Company . . . Seattle, Washington



PATENT PENDING

Construction Equipment Company . . . Spokane, Washington  
Intermountain Equipment Company . . . Boise, Idaho  
Arnold Machinery Company . . . Salt Lake City, Utah  
Contractors Equipment & Supply Co. . . Albuquerque, New Mexico

Manufactured by... GARLINGHOUSE BROTHERS

2416 EAST 16TH STREET, LOS ANGELES 21, CALIFORNIA



## Foresighted Plans For Post-War Jobs

(Continued from page 21)

essential highway transportation system.

Many contractors are giving serious thought to branching out into other phases of construction, and are taking advantage of this lull in activity to study methods and job organization and make plans for taking on new types of work in the post-war period. The transition from road building to airport construction, for example, has been made by many contractors during the period of war construction, and many others will be prepared to handle this type of work in the post-war period.

A careful study of equipment now will also be a tremendous help in the post-war period. No doubt competition will be keen, and the contractor who has prepared himself by keeping up-to-date on the newest equipment and what it will do will be in a better position to bid successfully on post-war jobs and complete them profitably. In this CONTRACTORS AND ENGINEERS MONTHLY is striving to be of as much aid as possible, by describing in its editorial columns many new pieces of equipment which are not generally available now but about which our readers should know in anticipation of construction in the days to come.

### Contractors Are People, Too

Contractors and engineers are not only members of the construction industry; they are also citizens of this country and of the world. Their post-war planning interests and activities should begin with their own communities, where they can be of tremendous help to local public officials in developing a program of needed public works which will provide jobs and economic stability in the community, in which naturally the contractor will share. Post-war prosperity must start at the grass roots, in the communities and states, from where it will spread to the nation and then throughout the world. Lack of plans in any one of these spheres may cause disaster in all of them.

The best program for post-war prosperity is twofold: it requires practical planning within one's own organization

to insure preparedness for post-war problems and post-war opportunities; and participation in national and international planning and cooperation for the reconstruction of the world.

*Eighty-two per cent of grade-crossing accidents occur at locations which have special protection, such as flashing lights, gates or watchmen, in addition to the standard warning signs, according to the National Safety Council.*

### New Pump Bulletin

Improved methods of pumping water from deep wells are described in a new pump bulletin recently issued by the manufacturer of Peerless pumps. Two basic methods of raising water are illustrated; interesting cross-section views of deep-well pumps, revealing the shafting and submerged pump elements, graphically demonstrate the operation of lifting water from any depth; and

various types of pump heads are described.

Copies of this Bulletin 141A may be secured by those interested direct from the Peerless Pump Co., 301 West Avenue 26, Los Angeles 31, Calif., by mentioning this item.

## FULL SPEED AHEAD DOWN THE VICTORY ROAD

Roads must be built and improved . . . that's our business here at Galion. Our rollers and graders are doing a good job of it with the armed forces. To help the war effort we urge you to study these objectives which will speed the final Victory:

- BUY War Bonds and Stamps Regularly
- SERVICE Equipment Periodically
- CONSERVE Man-power, Tools, Materials
- HEED the National War Fund
- GIVE Blood to Save Lives
- GUARD the Home Front Against Fires
- PRACTICE Safety First Always
- PROTECT Your Health—KEEP Well
- DONATE to Scrap Drive
- TRAVEL on Emergency or Business Only
- AVOID Spreading Rumors

*This fight is for every American. These objectives will help our fighting forces meet their objective. We can help so let's do it.*

### The Galion Iron Works & Mfg. Co.

Main Office and Works: Galion, Ohio

# GALION

## Another BIG Job for GOODALL Suction Hose!



The greatest salvage operation in history . . . and GOODALL was in the thick of it with equipment essential to its success. Those miniature Niagaras cascading in uninterrupted torrents from the steadily-righting deck of the "Normandie" were lifted from the depths of the ship through GOODALL No. 91 Rough Bore Suction Hose. The tough, durable construction of this hose was a perfect match for the continuous service involved. Built to the long-established standards for GOODALL quality, its performance on the biggest job of its kind has more than justified its selection.

Other GOODALL hose, and various types of GOODALL workmen's clothing, were also in evidence on this huge salvage project.

### GOODALL

HOSE, BELTING, BOOTS, CLOTHING . . . are made to "know-how" specifications that leave no chance for common faults or failures. Whether of American made rubber or the natural product, they can be relied upon to fulfill the promise of faithful, economical service that goes with every GOODALL RUBBER product.

MAIN OFFICE—2 South 36th St., PHILADELPHIA 4, PA.

Branches: New York • Boston • Pittsburgh • Chicago  
Gov't. Dept.—Washington, D.C. West Coast—Goodall Rubber Co. of Calif.: Los Angeles, San Francisco, Seattle, Salt Lake City.  
Factory: Trenton, N.J. (Established 1878.)

Buy WAR Bonds—Buy MORE Bonds—  
for VICTORY!

# GOODALL

RUBBER COMPANY INCORPORATED



Keep **PLACING**  
**AHEAD**  
of **MIXING**  
and **POURING**

with a *MALL*  
**VIBRATOR**

### Get Stronger Concrete Faster

MALL Vibrators set the pace for mixing and pouring and keep War construction jobs moving on schedule. In addition, they place low-water-cement-ratio concrete faster, better and cheaper than can be accomplished by any other method . . . eliminating honeycombs and voids . . . assuring a better bond with reinforcement . . . and permitting an earlier stripping of forms.

MALL Gasoline-Powered Vibrators, illustrated above, operate all day on very little fuel . . . are easy to start . . . and the variable speed engine supplies abundant power for 8 other quickly interchangeable tools for Wet Wall Rubbing, Sanding, Wire Brushing, Drilling, Sawing, Pumping and Sharpening Tools.

Plan NOW to save time, labor, power, and materials on YOUR next VICTORY job with MALL Gasoline-Powered Vibrators. Write at once for complete information and prices.



★ ★ Immediate delivery on Gasoline-Powered MALL H.P. and wheel barrow round base mounted H.P. units on suitable priority.

### Buy War Bonds

## MALL TOOL COMPANY

7743 SOUTH CHICAGO AVE.  
CHICAGO 19 ILLINOIS



Pledge Your Support  
BUY WAR SAVINGS  
BONDS AND STAMPS



## Treated Wood Used In War Structures

### Wood Culverts, Drainage Boxes and Pipe Substituted For More Critical Materials In Present Emergency

PRESSURE-creosoted wood has been of inestimable value during the present emergency to engineers in the United States and Canada in the construction of culverts, drain boxes and storm sewers for highways, railroads, munition plants and military camps and airports. A recent issue of *Wood Preserving News*, published by the American Wood-Preservers' Association, points out that treated-timber structures of this type require only a small amount of steel for fastenings, may be readily installed under almost any conditions of terrain and temperature, and are ready for use as soon as completed. The designs created for these purposes include both the plank and laminated wall construction for the rectangular types and wood pipes for the circular type. For subsurface drainage of airfields, many slotted boxes have been built.

On a recently completed road project on Highway 80 in New Mexico, the State Highway Department installed a number of multiple-span creosoted-wood culverts, in lieu of single-span bridges, to handle minor drainage courses. The top, bottom and walls of these structures are composed of laminations of lumber, spiked together. This material was framed to size and length before being given pressure treatment with 12 pounds of creosote per cubic foot of wood. The culverts were built in accordance with plans prepared by E. B. Van de Greyn, Bridge Engineer, New Mexico State Highway Department.

#### Use of Stave Culverts

Creosoted stave culverts have been manufactured and installed in considerable wartime work. This type of culvert has the feature that it may be built from pieces of lumber of small individual cross-section and short length—materials usually produced in quantity in any lumber-milling operation. One design frequently used provides for the employment of 2 x 4-inch staves for culvert diameters up to 30 inches and 3 x 6-inch staves for diameters between 36 to 60 inches. Steel bands are the only metal fastenings required.

The lumber for creosoted wood-stave drainage structures is ordinarily fabricated, treated, and shipped to the site for assembly. However, if the pipe lengths are not too long, and if there is variation in the diameters involved, the finished culverts may be nested for compactness and shipped ready to install. The latter method was adopted in some road work carried out by the Ordnance Department, U.S. Army, at a large mid-western project. The wood staves for that installation were pressure-treated by an empty-cell process with a final retention of 10 pounds of creosote per cubic foot, in compliance with Federal Specification TT-W-571b.

#### Railroad Culverts

The railroads have built many new pressure-treated drain boxes for tracks which have been laid during the present war. Where additional tracks were placed beside those already existing, it was frequently possible to extend the original drainage structures with wood boxes. In one such area, 24-inch cast-iron pipe and 36-inch corrugated pipe were lengthened with 2 and 3-foot square pressure-creosoted timber culverts. Another railroad recently took some treated timber salvaged from a dismantled structure, reframed and bored it to meet the plans for a new drain box, and re-treated it under pressure before installation for a second time. The second pressure treatment, lighter in final retention than the original, was intended primarily to restore the reframed material to its original state of preservation and impregnation.

Newly treated wood culverts have also been built under railroad tracks which have been in place for some time. In one case, a 5 x 5 x 80-foot Laminex pressure-creosoted box culvert was installed under a high fill supporting several tracks. The work was carried out by tunneling under the fill and building the box as the excavation was extended. This type of laminated box culvert is adaptable to underground construction since, if desired, it can be extended by increments of any length.

#### Airport Drainage

Many miles of culverts, drain boxes and storm sewers have been incorporated in airports, both military and civilian. In some locations, a slotted design has been employed in the usual conduits in order that these important land areas might be drained and kept in stable condition capable of carrying the loads imposed upon the surface. The width of the drainage slots is generally cut slightly greater on the inside surface of the box than on the outside in order to prevent clogging of the opening. The smaller drain boxes, of 10 x 12-inch inside dimensions or less, are usually made of plank and may also be provided with slotted openings to receive storm water and seepage by leaving small gaps between the pieces of lumber in the assembly.

A design that has been widely used in Canada consists of longitudinal plank side walls and cross plank top and bottom. Beveled drain slots are made between the top plank pieces. The usual pressure treatment prescribed in Canada for such structures is a final retention

of 8 pounds of creosote per cubic foot of wood.

#### Wartime Uses for Glue

A 20-page illustrated brochure, describing the use of waterproof glues in various types of construction, including arches and beams and such items as laminated pulley wheels, cleats, etc., has just been published by I. F. Laucks, Inc., of

Seattle, Wash., with particular emphasis on new uses for synthetic resin glue as a vital war material. A section on Laucks wood preservatives is also included, explaining low-cost treatments, such as water-repellent toxic preservatives, for plant application.

Copies of this brochure may be obtained by writing to I. F. Laucks, Inc., Maritime Building, Seattle 4, Wash., and mentioning this item.

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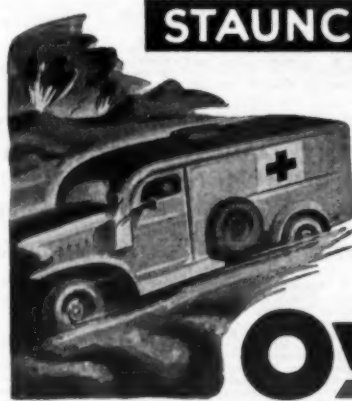
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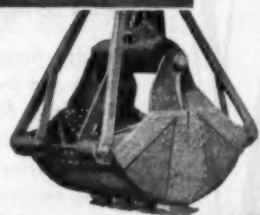
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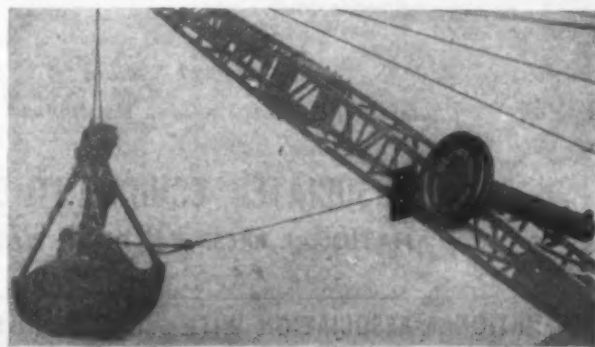


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## Two Diesel Engines Announced by Climax

The production of two solid-injection compression-ignition engines has just been announced by the Climax Engineering Co., Clinton, Iowa, manufacturer of Bluestreak 8 to 480-hp gas engines, 300-watt to 312-kva generating sets, and complete accessory equipment. Both of the new engines are four-cycle full diesels and are intended for use as light plants or as primary drives for pumps, compressors, and similar equipment.

Model D148 is a two-cylinder unit with a maximum rating of 22 hp, and may be equipped for pulley drive with or without clutch, or clutch and reduction gear, or auxiliary power take-off. As a diesel-electric plant it may be direct-connected on a single base with a 15-kva generator. The D148 with its equipment requires a space only 46 x 32 inches, while with the generator it occupies a 76 x 32-inch space.

Model D297 is a four-cylinder unit with a maximum rating of 44 hp, and is available with drive equipment similar to that furnished with the D148. A special feature of the D297, however, is that a flywheel, clutch, generator or marine gears may be installed on either or both ends, providing a radiator is not used. For electric light and power, the D297 may be used with a 30-kva generator. The D297 with equipment requires a 66 x 32-inch space and, with the generator, a 92 x 32-inch space.

Features of both models include a one-piece crankcase and cylinder housing for rigidity and maintained alignment, replaceable chrome-nickel iron cylinder liners for economical and infrequent maintenance, water-cooled exhaust manifold to provide cool running, and simple

design and accessibility of all parts for inspection.

Further information on these two new Climax diesels may be secured by those interested direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

### New Wellpoint Co. Office

The John W. Stang Corp., New York City, manufacturer of wellpoint systems, has announced the opening of a new branch at 215 S. W. Taylor St., Portland 4, Ore. William Kauffman, who has had many years of experience in dewatering and subsoil problems, will be in charge.

In addition, the Stang company maintains branch offices at San Diego, Calif., and Houston, Texas. Its main office is located at 2 Broadway, New York City.

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## Directory of EQUIPMENT DISTRIBUTORS

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a record of various lines handled.

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McKIERNAN-TERRY CORP.—Pile Hammers  
A. LESCHEN & SONS—Wire Rope  
NOVO—Engines, Pumps, etc.  
OMAHA—Dragline Buckets  
OWEN—Clamshell Buckets  
RANSOME—Concrete Mixers, Pavers, etc.  
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Cleveland Trainers  
Dobbie Derricks, Fittings  
Erie Rollers  
Gar-Bro Barrows, Carts  
Hercules Power Units  
Hough Sweepers  
Huber Rollers  
Interstate Tramways  
Jackson Concrete Vibrators  
Jaeger Mixers, Pumps  
Hoists, Paving Equip.  
Jones Bar Benches  
Kiesler Clamshell Buckets  
Kohler Lighting Plants  
Littleford Wheelbarrows  
McKiernan-Terry Pile Hammers  
Marion Shovels, Cranes, Draglines  
Nelson Bucket Loaders  
Ohio Locomotive Cranes  
Page Dragline Buckets  
Porta Conveyors  
Ransome Winches  
Rogers Bros. Trailers  
Schramm Air Compressors  
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Whiteman Concrete Surface  
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NORTHERN CONVEYOR CO.—Stationary & Portable Conveyor Units  
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SHOW REMOVAL EQ. CO.—Hotblades & Sierra Snow Piles  
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Inley—Excavators  
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Kochling—Shovels, Mixers  
Kwik-Mix—Mixers  
Littleford—Bituminous Equipment  
Mail—Vibrators  
National Lead—Cinch Anchor Specialties  
Parsons—Trenchers  
Paxon—Bearing Saw Tables  
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American Mfg. Co.  
Bethlehem Steel Co.  
Bates Valve Bag Corp.  
Clyde Iron Works, Inc.  
Diamond Iron Works  
Gardner-Denver Co.  
The German-Rupp Co.  
Inley Mfg. Co.  
The Jaeger Machine Co.  
Jones Superior Machine Co.  
C. S. Johnson Co.  
Kehring Co.  
Kwik-Mix Mixer Co.

Littleford Bros.  
M & M Wire Clamp Co.  
Mail Tool Co.  
Owen Bucket Co.  
Parsons Co.  
Page Engineering Co.  
J. G. Pollard Co.  
Sagen Derrick Co.  
Sauerman Bros., Inc.  
Sterling Wheelbarrow Co.  
Teledo Pressed Steel Co.  
Templeton, Kenly & Co., Inc.  
Van Dorn Iron Works Co.  
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

**ALBAN TRACTOR CO., INC.**  
725-27 East 25th St. Baltimore, Md.

**Representing**

CATERPILLAR TRACTORS AND ROAD MACHINERY  
ATHEY TRUSS WHEEL CO.  
JOHN DEERE Industrial and Agricultural Equipment  
GARDNER-DENVER CO.  
GENERAL EXCAVATOR CO.  
HERCULES ROLLER CO.  
"INVADE" SHOVELS  
KILLER MFG. CO.  
LAPLANT-CHOATE MFG. CO.  
OSGOOD CO. Shovels, Cranes, Draglines  
PIONEER ENGRS. WKS., INC.  
R. G. LeTourneau, Inc.  
ROGERS BROS. CORP.  
WILLAMETTE HYSTER CO.  
WM. BROS. SOILER MFG. CO.

CATERPILLAR DIESEL AND GAS POWER UNITS

Member: Associated Equipment Distributors

**D. C. ELPHINSTONE, INC.**  
115 S. Calvert St. Baltimore, Md.  
1203 Nat'l Press Bldg., Washington, D. C.

**Representing**

E. D. Elyre & Co.  
Electric Taper & Equip. Co.  
Emerson Pump & Valve Co.  
Goodall Rubber Co.  
German-Rupp Company  
Hauk Mfg. Co.  
H. K. Porter Co.  
Hough-Universal Sweepers  
Huber Mfg. Co.  
Inley Mfg. Co.  
C. S. Johnson Co.  
Kehring Co.

Kwik-Mix Co.  
LaBarre Co., Inc.  
Lambert-Natl' Hoist Div.  
Linn Mfg. Corp.  
McKiernan-Terry Corp.  
Minwax Co.  
Owen Bucket Co.  
Parsons Co.  
Reed-Prentice Corp.  
Sauerman Bros. Inc.  
Syntron Co.  
Trueman Steel Co.  
Werthington Pump & Machy. Corp.

Member: Associated Equipment Distributors

**JOHN C. LOUIS COMPANY**  
INCORPORATED  
511 W. Pratt St. 4821 Bethesda Ave. Baltimore, Md. Bethesda, Md.

**Representing**

AMERICAN CABLE—Trolley Wire Rope  
BUTLER—Bins  
CENTAUR—Road Mowers  
CLEVELAND—Paving Breakers, Sinker Drills  
SALON—Leaning - Wheel Graders  
GENERAL—Wheelbarrows  
ROADS—Crushers, Road Pavers  
JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.

JONES—Saw Rigs  
LAKEWOOD—Finishers, Forms, Towers  
LEROI—Air Compressors  
LITTLEFORD—Asphalt Heaters, Distributors  
MALL—Concrete Vibrators  
TIMKEN—Detachable Rock Bits  
WHEELING—Corrugated Culvert Pipe

Member: Associated Equipment Distributors

**McCLUNG-LOGAN EQUIPMENT CO., INC.**  
Key Highway & McComas St., Baltimore, Md.

**Sales—Service—Rentals**

Allis-Chalmers—Tractors, Graders, Power Units  
Baker—Scrapers, Bulldozers, Trailbuilders, Snow Plows  
Chicago—Pneumatics, Drills, Breakers, Pneumatic and Electric Tools  
Cleveland—Formers, Form Tampers  
Eugene—Wagons, Bulldozers  
Gar Wood—Sweepers, Bulldozers, Trailbuilders  
Grice—Road Sweepers  
Haise—Loggers, Conveyors, Buckets  
Hough—Shovels  
Jones & Laughlin—Gilmore Wire Ropes  
Northwest—Shovels, Cranes, Draglines  
Pioneer—Dragline Buckets  
Wiley—Whirlies, Steel Barges, Conc. Buckets, etc.

Curing Materials, Hunt Process Ritecure

Member: Associated Equipment Distributors

**THE HENRY H. MEYER CO., INC.**  
110 S. Howard St., Baltimore, Md.  
1133 13th St., N.W., Washington, D.C.

**Representing**

Barber-Greene Co.  
Bay City Shovel, Inc.  
Blaw-Knox Co.  
Bostwin Co.  
Columbus Conveyor Co.  
Conroy & Co., Inc.  
Hobbs-Ford & Mach. Co.  
Domestic Eng. & Heat Div.  
Duff-Norton Mfg. Co.  
Harrington Co.  
Hersell-Rand Co.  
Jackson Mfg. Co.

Johns-Manville  
A. Lechen & Sons Rope Co.  
Lidgerwood Mfg. Co.  
Lima Locomotive Works  
Master Vibrator Co.  
New Engine Co.  
Richmond Screw Anchor Co.  
Shaw-Wat. Cr. & Heat Div.  
Sterling Wheelbarrow Co.  
Templeton, Kenly & Co.  
Union Iron Works, Inc.  
Universal Road Machy. Co.

Member: Associated Equipment Distributors

**CLARK-WILCOX COMPANY**  
118 Western Ave. Boston, Mass.

**Representing**

ALLIS-CHALMERS—Tractors  
ATLAS—Power, Blasting Equipment  
BAKER—Bulldozers  
BEEBE BROS.—Hoists  
BLYSTONE—Mortar Mixers  
BUCHUS-ERIE—Cranes, Shovels, Draglines  
BURCH—Road Pavers, Road Machinery  
CLEVELAND—Formers, Drills  
C. R. JAHN CO.—Trailers  
GARDNER-DENVER—Air Compressors  
HAISSE—Elevators, Conveyors and Loaders  
HAUCK—Oil Burners and Heaters  
HAZARD—Wire Rope, Cable  
HELTZEL—Bins and Forms  
HOMESTEAD—Hydraulic Jenny Cleaner  
MARLOW—Self-Priming Pumps  
MASTER—Vibrators  
PIONEER—Crushers, Gravel Plants  
RANSOME—Concrete Mixers, Chuting Equip.  
GAR WOOD—Scrapers, Sheepfoot Rollers

Member: Associated Equipment Distributors

**HEDGE & MATTHEIS CO.**  
285 DORCHESTER AVE. BOSTON 27, MASS.

**Representing**

Aeroli Burner Co., Inc.  
Byers Corp.  
Byers Machine Co.  
Concrete Surfacing Machy. Co.  
Electric Taper & Eq. Co.  
Four-Wheel Drive Auto Co.  
Frink, Carl H.  
Hercules Motors Corp.  
Ingersoll-Rand Co.  
Jaeger Machine Co.  
Jones Superior Machine Co.  
Joseph F. Kistler Co.  
A. Lechen & Sons Rope Co.  
Lima Manufacturing Corp.  
McKiernan-Terry Corp.  
Lambert-Natl' Hoist Div.

N. P. Nelson Iron Wks., Inc.  
Owen Bucket Co.  
Page Engineering Co.  
Red Star Products Co.  
W. A. Riddell Corp.  
Rogers Bros. Corp.  
Rome Grader & Machinery Corp.  
Sagen Derrick Co.  
Sauerman Bros. Inc.  
Syntron Co.  
Teledo Pressed Steel Co.  
Universal Crusher Co.  
Universal Form Clamp Co.  
Wood Shovel & Tool Co.  
Whiteman Mfg. Co.

Member: Associated Equipment Distributors

**PARKER, DANNER COMPANY**  
817 Albany St., Boston, Mass.

**Representing**

Barco—Gasoline Hammers  
Beach-Saw Tables  
Broderick & Bascom—Wire Rope  
Clyde—Hoists, Derricks  
Gorman-Rupp—Pumps, etc.  
Harrington—Chain Hoists  
Inley-Hoist Div., Cranes, Wagons, Buckets & Trailers  
Jackson—Wheelbarrows & Concrete Carts  
Johnson-Bins, Batches & Wheelbarrow Scales, etc.  
Kehring—Shovels, Cranes, Pavers, Mixers, Dumpers, Trailblump, Wheelers, etc.

Longitudinal Finishers, Mudjacks  
Kwik-Mix Concrete Mixers  
Mortar & Plaster & Bituminous Mixers  
Master-Vibrators, Generators, etc.  
Page—Dragline Buckets  
Parsons—Trenchers, Backers  
Sagen-Derricks, Winches, etc.  
Sullivan—Compressors, Rotators, Paving Breakers, etc.  
Timken—Rock Bits  
Union-Pile Hammers, etc.

Also small tools, etc.

Member: Associated Equipment Distributors

**W. H. ANDERSON CO., INC.**  
47 W. Seven Mile Rd., Detroit, Mich.  
Phone: Townsend 9-5400

**Representing**

(Exclusive)

American Cable Wire Rope  
Buffalo-Springfield Rollers  
Cleveland Trencher Ditchers  
Eugene Bottom Dump & Rear Dump Dirt Handling Trucks  
Grand Specialties C Clamps  
Haise Loaders  
Iowa—Asphalt, Gravel, Rock Plants, Crushers, Conveyors, Bins, etc.  
C. S. Johnson Batches, Bins, etc.  
Knickerbocker Conc. Mixers  
Linn Track Trucks  
Metal Form Steel Rd.

Forms, Curb, Silo, Wall Forms, etc.  
Manitowish St. Sweepers, Flushers, etc.  
New Engines, Pumps, Hoists, etc.  
Wellman Engrs. Buckets  
Whiteman Precision Floor Finisher (Gas or Elec.)  
Werthington Pump Compressors, Pneumatic Tools (Non-exclusive)  
Page Engrs. Dragline Buckets  
Sagen Derrick Pole Derricks  
Sterling Wheelbarrows, Concrete Carts

Member: Associated Equipment Distributors

**R. G. MOELLER COMPANY**  
14415 Meyers Rd., Detroit, Mich.

**Representing**

Bay City Shovel, Inc.  
Bethlehem Steel Co.  
C. H. & E. Mfg. Co.  
The Central Corp.  
Dravo Corp.  
Flexible Road Joint Machine Co.  
Holtzel Steel Form & Iron Co.  
Hercules Motors Corp.  
Hometead Valve Mfg. Co.  
Ingersoll-Rand Co.  
J. F. Kistler Co.  
La Roi Co.  
Lidgerwood Floor Machy. Co.

Link-Belt-Speeder Corp.  
McKiernan-Terry Corp. and Lambert-Natl' Hoist Div.  
Milwaukee Elec. Tool Co.  
Sagen Derrick Co.  
Slusser-McLean Scrapper Co.  
Smith Eng. Works  
Smith Co., T. L.  
Sterling Wheelbarrow Co.  
Templeton-Kenly Co.  
Toledo Wheelbarrow Co.  
Tri-Lok Co.  
Waukesha Motor Co.  
Wisconsin Motor Corp.

Member: Associated Equipment Distributors

**THORMAN W. RSHOLT CO.**  
3138 Snelling Ave. Minneapolis, Minn.

**Representing**

ADAMS Power Grader  
BAILY Concrete Vibrator  
BARCO Hammers  
BEACH Saws  
"BEIG" Concrete Surface  
BUCHUS-ERIE Scrapers and Bulldozers  
BUFFALO-SPRINGFIELD Rollers  
CHICAGO PNEUMATIC Compressors and Tools  
CLEAVER-BROOKS Bolt Cutters  
CORRUGATED Steel Sheet Piling  
GORMAN-RUPP Pumps  
INSLEY Shovel and Cranes  
INTERNATIONAL Indus. Tractors  
IOWA "Cedar Rapids" Cranes, Plants and Equip.

JOHNSEN Batches and Demountable Bins  
KWK-MIX Mixers  
KOEHRING Pavers, Mixers, Cranes, Dumpers  
LIDGERWOOD Hoists  
METAL FORMS CORP. MURPHY Diesels  
OWEN Buckets  
RAMSEY Hoists, Winches  
ROSCO Trailers and Bituminous Distributors  
SARGENT Snow Plows  
"SNOGO" Rotary Snow Plow  
SUPERIOR Form Clamps  
TRASKSON Loaders and Cranes  
UNION IRON WORKS VULCAN Steam and Gas Locomotives  
Member: Associated Equipment Distributors

**WM. H. ZIEGLER CO., INC.**  
Minneapolis, St. Paul, Duluth, Crookston, Minn.

**Representing**

ATHEY—Crawlers, Dump Wagon, Trailers  
BARBER-GREENE—Conveyors, Loaders, Ditchers  
BUCHUS-ERIE—Power Shovels, Cranes, Draglines  
BUTLER—Bins, Batches  
"CATERPILLAR"—Trailers, Engines, Road Machinery  
DAVENPORT—DESER Locomotives, Snow Plows  
FOUR WHEEL DRIVE AUTO CO.—Trucks  
FRINK—Snow Plows  
GARDNER-DENVER—Air Compressors, Drills  
HOMESTEAD—Hydraulic Jenny Sprays Cleaners  
KILLERHO—Road Rippers, Scrapers  
LAPLANT-CHOATE—Bulldozers, Snow Plows, Dump Wagon  
LESCHE—Wire Rope  
LETOURNEAU—Dirt Moving Equipment  
LITTLEFORD—Oil Distributors, Tar Kettles, Heaters  
MADSEN—Asphalt Plants  
PIONEER—Crushers, Gravel Plants  
REX—Mixers, Pavers, Mho-Mixers, Pumps  
"WILLIAMS"—Buckets

Member: Associated Equipment Distributors

**BORCHERT-INGERSOLL, INC.**  
2375 University Ave., St. Paul, Minnesota

**Representing**

"Adcon"—Bituminous Pavers  
Allis-Chalmers—Tractors  
Baker, Power Units  
American-Hoists and Derricks  
Baker-Bulldozers, Road Dies, Snow Plows  
Baker-Kneel-Bins, Batches, Forms, Buckets  
Foots—Concrete Pavers  
Gar Wood—Hydraulic and Cable Scrapers, Bulldozers, Tamping Rollers  
Gardner-Denver—Distributors, Street Flushers  
Haise—Loaders, Conveyors  
Hercules-Road Rollers  
Highway-Road Material Spreaders, Sanders  
Hough-Hydraulic Loaders, Road Sweepers  
Jackson—Concrete Vibrators

McKiernan-Terry—Pile Hammer, Pullers  
Michigan-Truck Shovels, Cranes  
Northwest—Shovels, Cranes, Draglines  
Nova-Pumps  
Oshkosh—Four Wheel Drive Trucks  
Sauerman—Drag Scrapers, Cableway Excavators  
Seaman-Pulvi-Mixers  
Smith-Concrete Mixers  
Snow-King—Rotary Snow Plows  
Sullivan—Air Compressors and Tools  
Telmith—Rock Crushers, Screens, Portable Floor Finishers

Member: Associated Equipment Distributors

**BUBLITZ MACHINERY CO.**  
2305 Pennway, Kansas City 8, Mo.

**Representing**

Austin-Western Rd. Machy. Co.  
Bethlehem Steel Co. (Williamsport Div.)  
Butler Bin Co.  
Cleveland Rock Drill Co.  
Cleveland Tractor Co.  
Electric Taper & Equipment Co.  
Jaeger Machine Co.  
Le Roi Co.—Air Compressors  
McKiernan-Terry Corp.  
Pioneer Engineering Wks., Inc.—Crushers  
Red Star Products Co.  
Sagen Derrick Co.  
The Sagen Steel Co.  
Union Fork & Hoe Co.  
Whitcomb Locomotive Co.  
"Williams"—Buckets and Trailers  
Wm. Brindley & Mfg. Co.  
Whiteman Mfg. Co.

Member: Associated Equipment Distributors

**FUNKHOUSER EQUIPMENT CO.**  
2425 Jefferson Street, Kansas City, Missouri

**Representing**

Barco Mfg. Co.  
Breuerick & Bascom Rope Co.  
Burch Corporation  
Climax Engineering Co.  
Diamond Iron Works  
Drake-Williams Mount Co.  
The Foote Co., Inc.  
The Hayward Co.  
The Heitzel Steel Form & Iron Co.  
Lidgerwood Mfg. Co.

Murphy Diesel Co.  
National Mower Co.  
Northwest Engineering Co.  
Nova Engine Co.  
Page Engineering Co.  
Red Star Products Co.  
The T. L. Smith Co.  
Sullivan Machinery Co.  
Union Iron Works  
Vibr Company

**THE G. W. VAN KEPPEL CO.**  
2440 Pennway Kansas City, Mo.

**Exclusively**

Ariens Co.  
American Hoist & Derrick Co.  
Beach Mfg. Co.  
Blaw-Knox Co.  
Brooks Equip. & Mfg. Co.  
Buckeye Traction Ditcher Co.  
J. I. Case Co.  
Chicago Pneumatic Tool Co.  
Cleveland Formgrader Co.  
Concrete Surfacing Machy. Co.  
Elgin Corp.  
E. D. Elyre & Co.  
Foote Co., Inc.  
Four Wheel Drive Auto Co.

Gorman-Rupp Co.  
W. E. Grace Mfg. Co.  
Huber Mfg. Co.  
J. E. Ingram Equip. Co.  
Inley Mfg. Co.  
Iowa Mfg. Co.  
Kalle Electric Machy. Co.  
Kehring Co.  
Kwik-Mix Concrete Mixer Co.  
A. Lechen & Sons Rope Co.  
Master Vibrator Co.  
Quik-Way Truck Shovel Co.  
Shovel Supply Co.  
Snow Removal Equipment Co.  
Wooldridge Mfg. Co.

Member: Associated Equipment Distributors

**O. B. AVERY COMPANY**  
1325 Macklind Avenue St. Louis, Mo.

**Exclusive Distributors of**

AMERICAN Hoists & Derricks  
AUSTIN-WESTERN Graders, Rollers, Sweepers, Scrapers, Crushers  
BARCO Hammers  
BLAW-KNOX Bins, Buckets, Finishers, Forms  
BRODERICK & BASCOM Wire Rope  
BURCH Spreaders, Snow Plows  
CHAIN BELT Mixers, Pavers, Pumps  
CLEVELAND Air Tools  
CLEVELAND Trenchers  
DEMPTER Dumpers  
LITTLEFORD Distributors, Tar Kettles  
MASTER Vibrators, Generators  
McKiernan-Terry Pile Hammers  
NORTHWEST Shovels, Cranes & Draglines  
R-B Subgraders  
SCHRAMM Compressors  
VULCAN Locomotives

Member: Associated Equipment Distributors

**CORBY SUPPLY COMPANY**  
3942-46 W. Pine Blvd., St. Louis, Mo.

**Representing**

AMERICAN—Flexible Metal Hose  
BURL CO.—Portable Air Compressors  
CHAMPION RIVET CO.—Rivets and Welding Rod  
CHICAGO PNEUMATIC—Portable Air Compressors  
D. A. NOBLEN CO.—Nozzle, Pneumatic  
D. TROIST & MACH. CO.—Air and Electric Hoists  
DAVILLBIS CO.—Paint Spray Equipment  
HANSEN MFG. CO.—Industrial Air Line Equipment  
HARDGOG WONDER DRILL CO.—Rock Drills and Paving Breakers  
WM. H. KELLER, INC.—Super Pneumatic Tools  
MUNSELL—Air-Operated Concrete Vibrators  
C. A. NOBLEN CO.—Nozzle, Pneumatic Product  
PANGBORN CORP.—Sandblast Equipment  
PENNSYLVANIA—Air Compressors and Pumps  
DAVID ROUND & SON—Chain Hoists  
STAYNEW—Air and Pipeline Filters  
N. A. STRAND & CO.—Flexible Shaft Equipment  
VAN DORN—Electric Drills, Grinders and Buffers  
VICTOR—Welding and Cutting Apparatus  
WESTINGHOUSE—Arc Welding Equipment  
GUSTAV WIEDEKE CO.—Tube Expanders

**JOSEPH KESL RENTAL EQUIPMENT CO.**  
4922 North B'way St. Louis, Mo.  
Shop & Yard: 5515 Bulwer Ave., St. Louis, Mo.  
(We rent construction equipment of all kinds)

**Representing**

Air Compressors  
Blade Graders  
Bulldozers, Backhoes  
Concrete Mixers  
Crawler Wagons, Tractors  
Elevating Graders  
Hoists  
Hydraulic Scrapers

Motor Graders  
Pumps  
Rock Crushers  
Rollers  
Rotary Scrapers  
Sand, Gravel Ex.  
Shovels and Draglines  
Wheel Tractors

Member: Associated Equipment Distributors

**C. F. RABBEIT, INC.**  
1523 N. Broadway St. Louis, Mo.

**Representing**

Baily Vibrator Co.  
Cleveland Formgrader Co.  
Cleaver-Brooks Co.  
Concrete Surfacing Machy. Co.  
Dravo Doyle Co.  
Fairbanks, Morse & Co.  
Good Roads Machinery Corp.  
Holtzel Steel Form & Iron Co.  
Frank G. Hough Co.

Huber Mfg. Co.  
Inley Mfg. Co.  
Kehring Co.  
Kwik-Mix Concrete Mixer Co.  
Lidgerwood Mfg. Co.  
Northern Conveyor Co.  
Parsons Co.  
Sagen Mfg. Co.  
Sterling Machinery Corp.  
Sterling Wheelbarrow Co.

Member: Associated Equipment Distributors

**THE GEO. F. SMITH CO., INC.**  
Franklin & Channing Aves., St. Louis, Mo.  
Complete Plants Rented

**Representing**

American Fork & Hoe-Shovel  
Archer-Tower Equipment  
Bemis-Tarpsauls, Burlap  
Blackhawk-Jacks  
Blystone-Mortar Mixers  
Brooks-Formgrader-Md. En.  
Cleveland Rock Drill-Air Tool  
Clyde-Hoists, Derricks  
Conec. Surfacing Mach.-Elec.  
Rubbing Stones  
Continental-Hose  
Davy-Compressors  
Edwards-Road Shovel  
Marlow-Branding Irons  
Fairbanks, Morse-Scales  
Hauk-Heaters, Tar Kettles  
Herman-Bar Benders  
Kelley-Power Floats  
Lechen-Hope

Link-Belt-Speed-O-Matic  
Mail-Vibrators, Grinders, Saws, Drills  
Nova-Pumps  
Owen-Clamshell Buckets  
Page-Buckets  
Red Star-Wheelbarrows  
Sagen-Derricks, Winches  
Schaefer-Salamanders  
Silent Hoist-Power Winches  
Braces, Jacks  
Smith, T. L.-Mixers, Truck Mixers  
Symonds-Column Clamps  
Templeton, Kenly-Trench  
Marlow-Branding Irons  
Universal-Form Clamps  
Vulcan-Hammers  
Williams-Conc. Surfaces  
Wiley-Concrete Buckets

Member: Associated Equipment Distributors

**TRACTOR & EQUIPMENT CO.**  
Sidney Montana

**Representing**

Caterpillar Tractor Co.  
Athey Truss Wheel Co.  
The Balderson Mfg. Co.  
Cardwell Mfg. Co., Inc.  
Killer Mfg. Corp.  
La Plante-Choate Mfg. Co.  
A. Lechen & Sons Rope Co.  
R. G. LeTourneau, Inc.  
Pioneer Engineering Works, Inc.  
Ritchie Mfg. Co.  
Trackson Co.  
Wellman Engineering Co.  
Willamette Hyster Co.

Member: Associated Equipment Distributors

**DALE & RANKIN, INC.**  
113 Frelinghuysen Ave., Newark, N. J.

**Representing**

AEROL Heaters and Tools  
ALEXIE Glass and Filings  
CHAMPION Sewer Cleaning Machines  
HELTZEL Road Forms and Bins  
INGERSOLL-RAND Compressors and Tools  
JACKSON Wheelbarrows  
REX Mixers and Pavers  
REX Pumps  
RICHMOND SCREW ANCHOR Concrete Accessories  
VIBRE-Hic. & Press. Concrete Vibrators  
WALKER-TURNER Radial Saws  
WALSH Snow Plows  
WINSLOW Scales

Member: Associated Equipment Distributors

**JOHNSON & DEALAMAN, INC.**  
255 South Street Newark, N. J.

**Representing**

Allis-Chalmers Tractors, Graders, Power Units  
American Snow Plows, Hoists, Derricks, Shovels  
American Cable Trolley & Crescent Wire Rope  
Baily Vibrators  
Baker Bulldozers, Graders, Scrapers, Rd. Equip.  
C. H. & E. Saw Tables & Hoists  
Cleveland Pneumatic Tools  
Gar Wood—Concrete Tractors, Bulldozers, Rd. Equip.  
Hauk Concrete & Water Heaters, Oil Burning Equip.  
Hatchings Road, Sidewalk & Concrete Forms  
Hough Hydraulic Loaders, Scrapers & Allied Tractor Attachments  
Jackson Wheelbarrows, Cans, Carts, Salamanders, etc.  
Lechen Steel Bins, Batches, Scales  
La Grasse Trailers  
Marlow Central, Diaphragm & Flanger Pumps  
Nelson Bucket & Snow Loaders  
R. H. & Shovels, Cranes  
Ransome Pavers, Mixers, Truck Mixers, Conc. Carts, Chuting Equipment  
R-B Star Wheelbarrows, Batch Boxes, Conc. Carts, Cushman Clamps & Adjustable Shores  
Sullivan Air Compressors & Tools  
Shovels, Cranes, Trailers, Rollers, etc.

Member: Associated Equipment Distributors



**CLYDE EQUIPMENT CO.**

Advance Car Mover Co.	Marvel Equipment Co.
At-Val Pump & Equip. Co.	M. P. McConfrey, Inc.
Barber Imperial Diesel Eng. Co.	McGraw-Hill Co.
Barneff Mfg. Co.	Oakshak Moler Tr. Mfg. Co.
Bell & Howell	Orion Crane & Shevel Co.
Bucyrus-Krie Co.	Owen Souders
Canada Iron Works, Inc.	Ramsey Machy. Co.
Cowling Holst Co.	Red Star Products Inc.
Crescent Surf. Machy. Co.	Rogers Derrick
Danco Corp.	Russman Brothers, Inc.
Davenport Washer Corp.	Shookum Co.
Dixon Valve & Coupling Co.	Smith & Smith Co.
Duff Norton Mfg. Co.	Smith Engineering Works
Durham Mfg. Co., Inc.	Smith Welding Equip. Co.
Handlan Inc.	Starling Wheelbarrow Co.
C. B. Johnson Co.	Stearns & Smith
Klauser Mfg. Co.	Templeton Kenly & Co., Inc.
Kohr Co.	Toledo Pressed Steel Co.
LeRoi Company	Union Fork & Hot Co.
A. Leschen & Sons Rope Co.	Van Ders Iron Works Co.
The Linde Air Products Co.	Vulcan Iron Works
	Wiley Machine Co., Inc.
	Worthington Mower Co.

**Member: Associated Equipment Distributors**

## LOGGERS & CONTRACTORS

**MACHINERY COMPANY**  
240 S.E. Clay St. Portland, Ore.

*Representing*

Archer Iron Works	W. E. Grace Mfg. Co.
Broderick & Bassom Rope Co.	Warrick-Beggs Corp.
Buckeye Tractor Ditcher Co.	Hercules Motors Corp.
Butler Bin Co.	Ingersoll-Rand Co.
Chain Belt Co.	J. E. Ingram Equip. Co.
Diamond Iron Works	Kay-Brunner Steel Products Inc.
Euclid Road Machy. Co.	Metal Forms Corp.
Garlinghouse Bros.	Plymouth Locomotive Works
	Ramsey Machy. Co.—Holata
	Vapor Blast Mfg. Co.
	Woolridge Mfg. Co.

## A. R. AMOS, Jr.

**713 Commercial Trust Bldg.,  
Philadelphia, Pa.**

*Representing*

Abbe Engineering Co.  
Barber-Greene Co.  
Beach-Russ Co.  
Lecourtenay Co.  
Sauerman Bros. Co.  
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and gravel plant equip-  
ment  
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boilers  
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Bak"  
"Danco" Salamanders  
Flexible Road Joint Ma-  
chines  
Gallon Graders, Rollers and  
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Good Roads Snow Plows  
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Towers & Buckets  
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Syntro Co.  
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Vapor Blast Mfg. Co.  
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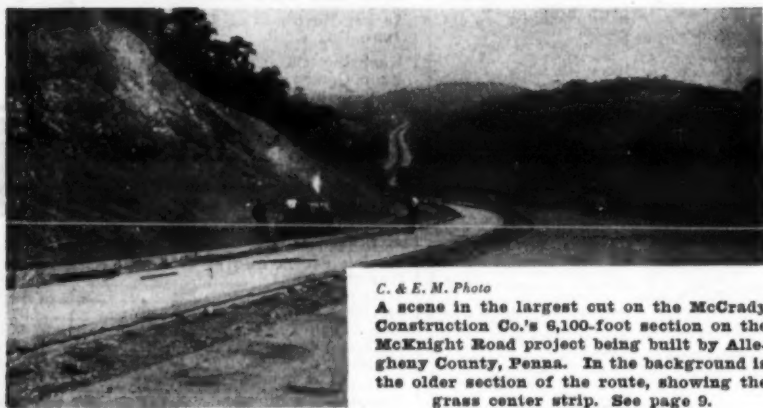
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# Contractors and Engineers Monthly



A new Flight Strip in the East, showing the 4,000-foot paved runway, and extensions. Upper left, looking down into the well pit which supplied all water for the sand-cement mix for the extensions. Left, unusual tank-truck equipment for applying water for the extensions. Left, unusual tank-truck equipment for applying water included this 975-gallon truck mixer, and the 1,200-gallon steel tank with a Novo portable pump alongside shown at the right. See page 1.

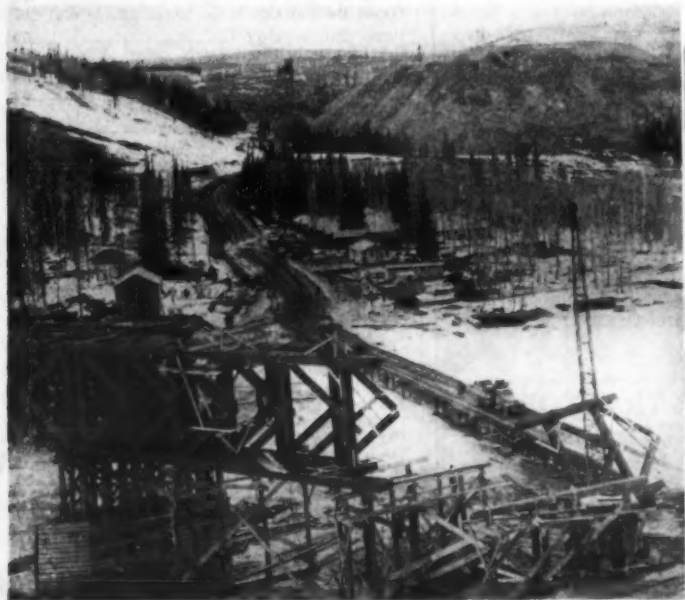


C. & E. M. Photo

A scene in the largest cut on the McKnight Construction Co.'s 6,100-foot section on the McKnight Road project being built by Allegheny County, Penna. In the background is the older section of the route, showing the grass center strip. See page 9.



At this typical county garage of the Ohio Department of Highways, 1,000-mile inspections of Department vehicles are made as part of Ohio's preventive maintenance program. See page 13. Ohio Dept. of Highways Photo



Public Roads Administration Photo  
Construction of the Sikanai Chief River Bridge on the Alaska Highway, showing the Army-built bridge across the stream and Pederson Construction Co.'s camp on the far bank. This permanent crossing has native-spruce piles, Douglas-fir trusses for the three spans, and a laminated wood deck. See page 11.



Left, an assembled section of a treated-timber truss for the Sikanai Chief River Bridge being lowered into place. The trusses were fabricated on the ice in quarter sections weighing about 9 tons and then raised into place by a crane counterweighted to handle the load. Below, treated-timber decking being placed on the north approach span. See page 11.

Public Roads Administration Photo

